AECOM
800 LaSalle Ave. Suite 110
Minneapolis, MN 55402

612-376-2000 tel
612-376-2471 fax

940771

April 3, 2017

Ms. Jamie Wallerstedt
Minnesota Pollution Control Agency
Remediation Division
520 Lafayette Avenue North
St. Paul, Minnesota 55155

Subject: FY 2017 2nd Quarter – Quarterly Sampling Event; MacGillis & Gibbs Superfund Site; AECOM Project 60436248; MPCA Work Order 3000016591 Event 2 of 4

Ms. Jamie Wallerstedt,

This groundwater monitoring report provides a summary of the quarterly groundwater monitoring event performed by AECOM Technical Services (AECOM) in November 2016 at the MacGillis & Gibbs site in New Brighton, MN (Figure 1). This work was performed by AECOM for the Minnesota Pollution Control Agency (MPCA) under MPCA Work Order 3000016591.

Groundwater monitoring is being conducted to evaluate contaminant trends over time relative to the chemicals of concern (COCs) as a result of operations associated with the former MacGillis & Gibbs facility. Moreover, the change in contaminant concentration over time assists in determining how the aquifer is responding to the shutdown of non-source extraction wells EW-1, EW-3B, EW-4, EW-5, EW-12, EW-15, EW-16, and EW-18 in December 2014. This groundwater monitoring event is the second of four quarterly events for this Work Order for FY17 (Fourth Quarter, 2016).

Groundwater samples were submitted to a State Contract Laboratory for analysis of pentachlorophenol (PCP), arsenic, hexavalent chromium and dioxins—all of which have been historically present in the contaminant plume. Each groundwater sample was collected in accordance with MPCA Guidance. Additionally, groundwater elevations were measured to evaluate any changes to the groundwater flow due to the December 2014 shutdown of the non-sources area extraction wells.

Procedures

Sampling of both monitoring and extraction wells was conducted using the following procedures:

- New nitrile gloves were used at each well to minimize the potential for cross contamination,
- Water level measurements were taken to the closest 0.01 foot from the top of inner most casing of the each well to the top of the water table prior to sampling ,
- New tubing was used at each well,
- Static water was purged from the well prior to sampling using a low flow device.
    - The field parameters (pH, specific conductance, temperature, dissolved oxygen) were measured when purging each well,
    - Groundwater samples were collected once field parameters stabilized or after the equivalent of three well volumes of groundwater were removed; whichever occurred first,
- The following procedures were followed for sample collection:
    - Samples for arsenic analysis were field filtered using a 0.45 micron in-line filter and preserved with nitric acid,

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Minneapolis, MN 55402
612-376-2000 tel
612-376-2471 fax

- Samples for arsenic, PCP and dioxin analysis were delivered to the lab within 48 hours of collection,
- Samples for hexavalent chromium analysis were delivered to the lab for analysis within 24 hours of collection.

- Any submerged pumping equipment was either decontaminated with Alconox and distilled water or replaced prior to sampling additional wells,
- The MPCA Lab Checklist was completed for all analytical results (Appendix 2).

Results

A summary of the FY 17 2nd quarter analytical results are shown in Table 1. Detailed results for the dioxin analyses are provided in Table 2. To provide further reference, analytical results from December 2013-August 2016 are presented in Table 3. Current and historical groundwater elevations are shown in Table 4.

Recommendations

Based on the analytical results, dioxin analysis will be discontinued from the quarterly monitoring. The next monitoring event will be conducted in the winter of 2017.

Attachments

Figure 1. FY 2017 Quarter 2 MacGillis and Gibbs Well Sample Locations

Table 1. FY 2017 Quarter 2 MacGillis and Gibbs Groundwater Contaminant Concentrations
Table 2 FY 2017 Quarter 2 MacGillis and Gibbs Groundwater Dioxins Concentrations
Table 3. MacGillis and Gibbs Groundwater Contaminant Concentrations 2013-2016
Table 4. Post Extraction Well Shutdown Trend Analysis
Table 5. Historical Groundwater Elevation

Appendix 1. Laboratory Analytical Results
Appendix 2. MPCA Lab Checklists

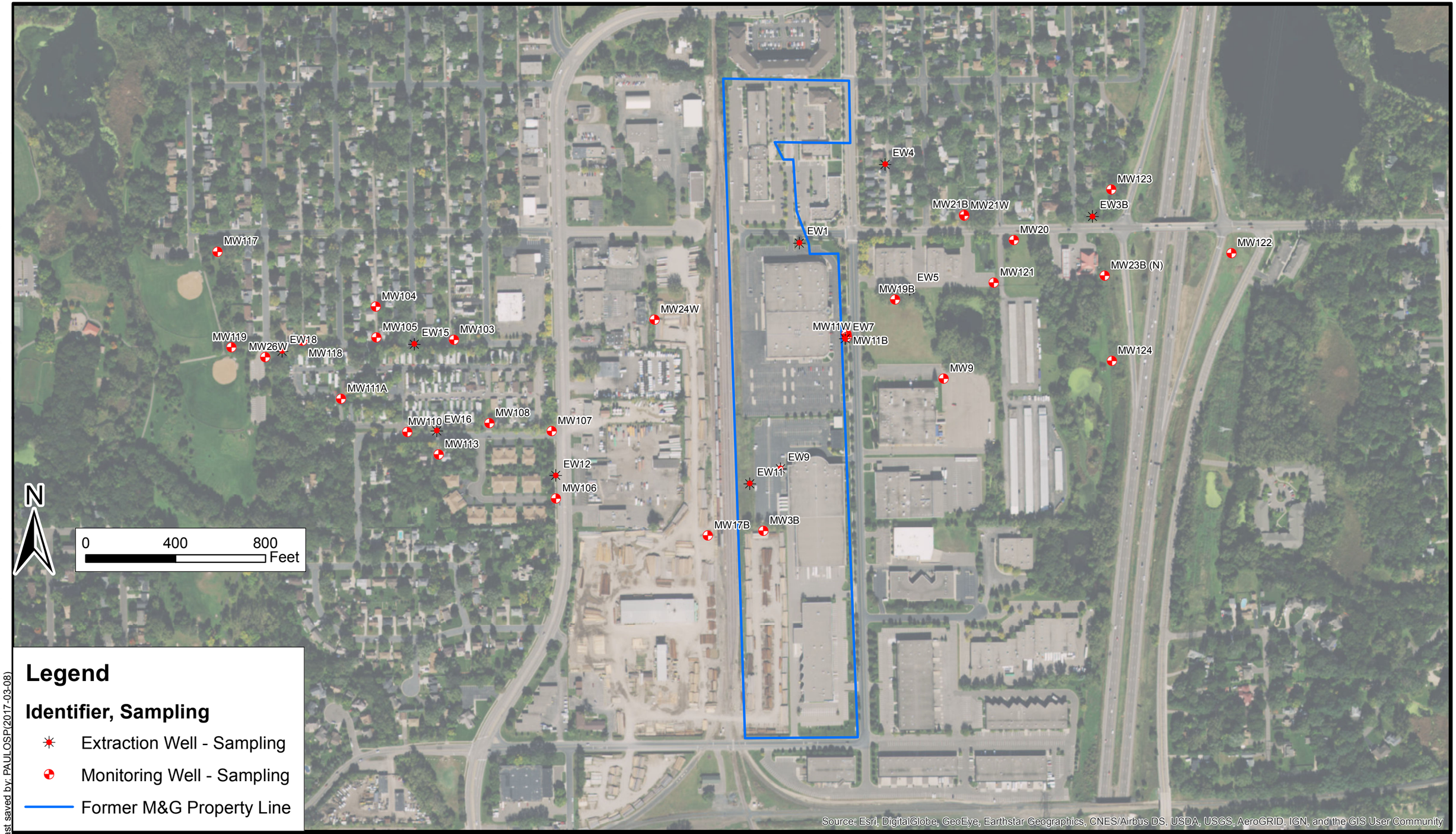
Please contact Drew Tarara or Tony Coryell at 612-376-2000 with questions or comments in regards to this report or other project business.

Respectfully,

Andrew J. Tarara
Project Manager
andrew.tarara@aecom.com

Tony Coryell
Project Scientist
tony.coryell@aecom.com

cc
Cover Letter.docx



Filename: P:\Water_Env\MPCA\FY17_MPCA\FY17 Projects\60436248 MacGillis&Gibbs O&M FY17\900_WorkingDocs-CAD\2017\PDFs\Figure 2 - Sampling Location Map.mxd
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MacGillis and Gibbs
Quarterly Monitoring Memo
New Brighton, MN
Project No.: 60436248 Date: 3/8/2017

Quarterly Sampling Location Map

AECOM
Figure 1

Table 1
FY 2017 Second Quarter Groundwater Contaminant Concentrations
MacGillis and Gibbs

			Pentachlorophenol ug/L	Arsenic Dissolved ug/L	Chromium(VI) Total ug/L	Total 2,3,7,8-TCDD Equivalence[a] pg/L
		Cleanup Goal:	**1**	**5**	**100**	**12**
Well ID	**Unique Well ID**	**Date Sampled**				
EW-1	592308	11/02/16	< 0.63	2.3	**115**	--
EW-3B	683305	11/02/16	< 0.61	**6.4**	< 0.050	--
EW-3B FD	683305	11/02/16	< 0.67	**6.2**	< 0.050 J	--
EW-4	616507	11/03/16	< 0.63	0.72	7.6	--
EW-5	623329	11/02/16	< 0.62	0.53	< 0.079 J	--
EW-7	616483	11/03/16	**42.8**	--	44.4	--
EW-9	616485	11/04/16	**20500**	--	--	--
EW-11	623340	11/03/16	**1090**	--	--	0.086 J
EW-12	628999	11/03/16	**2.7**	0.28 J	0.36 J	--
EW-15	628907	11/03/16	< 0.66	0.89	< 0.050 J	--
EW-16	628911	11/03/16	< 0.62	0.87	0.25 J	--
EW-18	683303	11/03/16	< 0.64	0.82	1.3 J	--
MW-3B	478240	11/01/16	< 0.63	--	--	--
MW-3W	478217	11/01/16	0.39 J	--	--	7.1
MW-9	478245	11/02/16	< 0.65	--	4.3	--
MW-11B	478230	11/03/16	**5210**	0.64	< 0.050	0.65 J
MW-11W	478222	11/03/16	--	--	**298**	--
MW-17B	515061	11/04/16	**769**	--	--	--
MW-17B FD	515061	11/04/16	**727**	--	--	0.34
MW-19B	522741	11/02/16	**135**	0.85	0.61 J	0.027
MW-20	522739	11/03/16	**49.8**	1.1	**791**	0.07 J
MW-20 FD	522739	11/03/16	**47.0**	1.1	**827**	0.09 J
MW-21B	522735	11/03/16	< 0.65	0.39 J	45.4	--
MW-21W	522734	11/03/16	**19.7**	0.41 J	< 0.050	--
MW-23B	598356	11/04/16	**23.1**	--	--	--
MW-24W	592323	11/04/16	**23.1**	--	--	--
MW-26W	592301	11/01/16	< 0.64	--	--	--
MW-103	619704	11/02/16	< 0.62 J	--	--	--
MW-104	619705	11/02/16	**45.7 J**	--	--	--
MW-105	619709	11/02/16	**67.0 J**	--	--	--
MW-105 FD	619709	11/02/16	**71.3 J**	--	--	--
MW-106	619712	11/04/16	< 0.63	--	--	--

Table 1
FY 2017 Second Quarter Groundwater Contaminant Concentrations
MacGillis and Gibbs

			Pentachlorophenol ug/L	Arsenic Dissolved ug/L	Chromium (VI) Total ug/L	Total 2,3,7,8-TCDD Equivalence[a] pg/L
		Cleanup Goal:	**1**	**5**	**100**	**12**
Well ID	**Unique Well ID**	**Date Sampled**				
MW-107	619713	11/04/16	0.60 J	--	--	--
MW-108	619714	11/04/16	< 0.67	--	--	--
MW-110	619715	11/01/16	< 0.63	--	--	--
MW-111A	684901	11/01/16	< 0.62	--	--	--
MW-113	619719	11/01/16	< 0.62	--	--	--
MW-117	619725	11/01/16	< 0.62	--	--	--
MW-118	619726	11/02/16	**33.0 J**	--	--	--
MW-119	619727	11/01/16	< 0.63	--	--	--
MW-121	619729	11/02/16	< 0.64	1.3	--	--
MW-122	658172	11/01/16	< 0.62	--	--	--
MW-123	619730	11/02/16	0.33 J	**6.2**	--	--
MW-124	658173	11/04/16	< 0.64	--	--	--

Notes:

<XX - Less than the laboratory reporting limit

BOLD = Concentration exceeds the site clean up goal

- = Not analyzed for this parameter

[a] - Calculated using 2005 WHO Factors

B1 - Associated with laboratory method blank contamination

J = Estimated concentration

Well IDs:

"W" used in the suffix indicates the well screen in in a shallower zone

"B" is assigned to wells where the screen is near the base or near-bottom of the New Brighton aquifer

Table 2
FY 2017 Second Quarter Groundwater Dioxin Concentrations
MacGillis and Gibbs

	Well ID	EW-11	MW-3W	MW-11B	MW-17B	MW-19B	MW-20	MW-20 FD
	Sample Date	11/3/2016	11/1/2016	11/3/2016	11/4/2016	11/2/2016	11/3/2016	11/3/2016
	Unique Well ID	623340	478217	478230	515061	522741	522739	522739
Analyte	**Units**							
2,3,7,8-Tetrachlorodibenzofuran	pg/L	< 1.5	< 1.4	< 1.7	< 0.53	< 0.47	< 1.7	< 1.9
Tetrachlorodibenzofurans	pg/L	< 1.5	< 1.4	26	0.69 J	0.83 J	< 1.7	< 1.9
2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/L	< 1.7	< 0.64	< 2	< 0.46	< 0.63	< 1.8	< 1.6
Tetrachlorodibenzo-p-dioxins	pg/L	< 1.7	< 0.64	< 2	< 0.46	< 0.63	< 1.8	< 1.6
1,2,3,7,8-Pentachlorodibenzofuran	pg/L	< 0.9	< 1.4	< 1.3	< 0.64	< 0.54	< 1.2	< 0.56
2,3,4,7,8-Pentachlorodibenzofuran	pg/L	< 0.68	1.4 J	< 0.91	< 0.32	< 0.32	< 0.81	< 0.44
Pentachlorodibenzofurans	pg/L	< 0.79	11 J	< 1.1	< 0.48	< 0.43	< 0.99	< 0.5
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/L	< 0.95	< 0.44	< 0.67	< 0.51	< 0.53	< 0.9	< 0.84
Pentachlorodibenzo-p-dioxins	pg/L	< 0.95	7.9 J	< 0.67	< 0.51	< 0.53	< 0.9	< 0.84
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L	0.84 B1	6.5 J	1 JB1	< 0.52	< 0.35	< 0.71	< 0.64
1,2,3,6,7,8-Hexachlorodibenzofuran	pg/L	< 0.68	< 0.28	< 0.93	0.46 J	< 0.29	< 0.59	< 0.72
2,3,4,6,7,8-Hexachlorodibenzofuran	pg/L	< 0.56	< 0.33	< 0.86	0.41 J	< 0.23	< 0.62	< 0.62
1,2,3,7,8,9-Hexachlorodibenzofuran	pg/L	< 1.1	< 0.37	< 2	< 0.42	< 0.32	< 0.69	< 0.92
Hexachlorodibenzofurans	pg/L	0.84 B1	100	< 1.2	< 0.44	< 0.3	< 0.65	1.4 B1
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/L	< 3	2.2 J	< 0.97	< 0.5	< 0.35	< 2	< 0.97
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/L	< 3.4	7.8 J	1.4 JB1	< 0.47	< 0.42	< 1.9	< 0.96
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/L	< 2.8	1.8 J	< 1.1	< 0.48	< 0.41	< 2	< 1
Hexachlorodibenzo-p-dioxins	pg/L	< 3.1	78	1.7 B1	0.64 J	< 0.4	< 1.9	< 0.98

Table 2
FY 2017 Second Quarter Groundwater Dioxin Concentrations
MacGillis and Gibbs

	Well ID	EW-11	MW-3W	MW-11B	MW-17B	MW-19B	MW-20	MW-20 FD
	Sample Date	11/3/2016	11/1/2016	11/3/2016	11/4/2016	11/2/2016	11/3/2016	11/3/2016
	Unique Well ID	623340	478217	478230	515061	522741	522739	522739
Analyte	**Units**							
1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/L	< 1	87	7.9 J	10 J	< 0.43	2.2 J	1.9 JB1
1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/L	< 1.5	6.3 J	< 1.2	< 0.98	< 0.67	< 1.4	< 1.6
Heptachlorodibenzofurans	pg/L	< 1.3	450	33 J	25 J	< 0.55	7.3 B1	7.1 B1
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/L	< 1.4	290	25 J	12 J	1.5 J	3.5 J	4.9 J
Heptachlorodibenzo-p-dioxins	pg/L	< 1.4	1100	16 J	22 J	< 0.8	6.6 J	4.9 J
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	pg/L	< 2.9	450	28 J	30 J	< 1.3	12 J	13 J
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	pg/L	7.2 JB1	2900	230	81 J	38 B1	31 J	56 J
Total 2,3,7,8-TCDD Equivalence[a]	pg/L	0.086 J	7.1	0.65 J	0.34	0.027	0.07 J	0.09 J

Notes:

<XX - Less than the laboratory estimated detection limit

B - Less than 10x the method blank level

J - Estimated value

[a] - Calculated using 2005 WHO Factors

Well IDs:

"W" used in the suffix indicates the well screen in in a shallower zone

"B" is assigned to wells where the screen is near the base or near-bottom of the New Brighton aquifer

Table 3
Groundwater Concentrations 2013 to Fall 2016
MacGillis and Gibbs

			Pentachlorophenol ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L	Total 2,3,7,8-TCDD Equivalence[a] pg/L
		Cleanup Goal:	**1**	**5**	**5**	**100**	**100**	**100**	**100**	**12**
Well Name	**Unique Well ID**	**Date Sampled**								
EW-1	592308	04/25/13	< 22.5	1.6	--	**147**	--	--	--	--
EW-1	592308	12/10/13	--	1.5	--	**145**	--	--	--	--
EW-1	592308	08/17/16	< 0.61	2.1	--	--	--	**168**	--	--
EW-1	592308	11/02/16	< 0.63	2.3	--	--	--	--	**115**	**--**
EW-3B	683305	12/10/13	**197**	0.69	--	3.7	--	--	--	--
EW-3B	683305	09/29/14	**227**	--	1.1	--	3.9	--	--	--
EW-3B	683305	05/28/15	0.24 J	1.8	**16.5**	3.4	7.8	--	--	--
EW-3B	683305	11/20/15	< 0.33	**14.1**	**12.5**	--	--	9.9 J	--	--
EW-3B	683305	05/24/16	< 0.62	**5.7**	--	--	--	< 10	--	--
EW-3B	683305	08/18/16	< 0.62	**7.9**	--	--	--	< 0.50	--	--
EW-3B FD	683305	08/18/16	< 0.62	**7.8**	--	--	--	< 0.50	--	--
EW-3B	683305	11/02/16	< 0.61	**6.4**	--	--	--	--	< 0.050	--
EW-3B FD	683305	11/02/16	< 0.67	**6.2**	--	--	--	--	< 0.050 J	--
EW-4	616507	12/09/13	0.38 J	--	--	--	--	--	--	--
EW-4	616507	08/14/14	< 0.32	--	0.54	--	5.6	--	--	--
EW-4	616507	08/18/16	**3.2 J**	0.60	--	--	--	8.9	--	--
EW-4	616507	11/03/16	< 0.63	0.72	--	--	--	--	7.6	--
EW-5	623329	04/25/13	< 21.5	0.70	--	1.9	--	--	--	--
EW-5	623329	05/28/15	**2.1**	0.98	2.9	0.18	4.2	--	--	--
EW-5	623329	11/20/15	0.23 J	0.89	1.2	--	--	--	< 10	--
EW-5	623329	05/24/16	< 0.64 J	0.91	--	--	--	5.1	--	--
EW-5	623329	08/17/16	< 0.62	1.3	--	--	--	< 0.50	--	--
EW-5	623329	11/02/16	< 0.62	0.53	--	--	--	--	< 0.079 J	--

Table 3
Groundwater Concentrations 2013 to Fall 2016
MacGillis and Gibbs

			Pentachlorophenol ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L	Total 2,3,7,8-TCDD Equivalence[a] pg/L
		Cleanup Goal:	**1**	**5**	**5**	**100**	**100**	**100**	**100**	**12**
Well Name	**Unique Well ID**	**Date Sampled**								
EW-7	616483	12/09/13	< 22.0	--	1.6	--	28.3	--	--	--
EW-7	616483	08/13/14	0.52	--	--	--	--	--	--	--
EW-7	616483	05/29/15	**935**	--	--	--	--	--	--	--
EW-7 FD	616483	05/29/15	**812**	--	--	--	--	--	--	--
EW-7	616483	11/19/15	**5.1**	--	--	--	--	--	--	--
EW-7	616483	05/24/16	0.61 J	1.3	--	--	--	34	--	--
EW-7	616483	08/17/16	< 0.62 J	--	--	--	--	26.1	--	--
EW-7	616483	11/03/16	**42.8**	--	--	--	--	--	44.4	--
EW-9	616485	01/10/14	**102000**	--	--	--	--	--	--	--
EW-9	616485	08/13/14	**19800**	--	--	--	--	--	--	--
EW-9	616485	08/17/16	**31800**	--	--	--	--	--	--	--
EW-9	616485	11/04/16	**20500**	--	--	--	--	--	--	--
EW-11	623340	12/09/13	**2700**	--	--	--	--	--	--	--
EW-11	623340	08/13/14	**1900**	--	--	--	--	--	--	
EW-11	623340	08/17/16	--	--	--	--	--	--	--	0.27
EW-11	623340	11/03/16	**1090**	--	--	--	--	--	--	0.086 J
EW-12	628999	09/29/14	< 21.1	--	0.69	--	**1610**	--	--	--
EW-12	628999	05/29/15	**5.4**	0.39 J	0.36 J	1.2	1.3	--	--	--
EW-12	628999	11/20/15	**1.1**	0.50 J	0.41 J	--	--	--	< 10	--
EW-12	628999	05/24/16	**5.8**	0.34 J	--	--	--	< 10	--	--
EW-12	628999	08/18/16	**5.8 J**	0.30 J	--	--	--	0.32 J	--	--
EW-12	628999	11/03/16	**2.7**	0.28 J	--	--	--	--	0.36 J	--
EW-15	628907	09/29/14	**22.4 J**	--	**7.5**	--	53.3	--	--	--
EW-15	628907	05/29/15	0.21 J	0.87	2.2	1.8	56.1	--	--	--
EW-15	628907	11/20/15	< 0.33	0.85	4.3	--	--	--	< 10	--
EW-15	628907	05/24/16	< 0.62	0.68	--	--	--	< 10	--	--
EW-15	628907	08/18/16	< 0.64	0.53	--	--	--	0.91	--	--
EW-15	628907	11/03/16	< 0.66	0.89	--	--	--	--	< 0.050 J	--

Table 3
Groundwater Concentrations 2013 to Fall 2016
MacGillis and Gibbs

			Pentachlorophenol ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L	Total 2,3,7,8-TCDD Equivalence[a] pg/L
		Cleanup Goal:	**1**	**5**	**5**	**100**	**100**	**100**	**100**	**12**
Well Name	**Unique Well ID**	**Date Sampled**								
EW-16	628911	09/29/14	**23.2**	--	0.91	--	0.95	--	--	--
EW-16	628911	05/29/15	0.25 J	1.4	1.3	0.29 J	1.2	--	--	--
EW-16	628911	11/20/15	< 0.33	1.5	1.5	--	--	--	< 10	--
EW-16	628911	05/25/16	< 0.66	0.96	--	--	--	--	--	--
EW-16	628911	08/18/16	< 0.62	0.98	--	--	--	0.12 J	--	--
EW-16	628911	11/03/16	< 0.62	0.87	--	--	--	--	0.25 J	--
EW-18	683303	09/29/14	**25.4**	--	1.2	--	0.32 J	--	--	--
EW-18	683303	05/29/15	0.21	0.94	1.1	0.75	12.4	--	--	--
EW-18	683303	11/20/15	< 0.32	0.90	**7.1**	--	--	--	< 10	--
EW-18	683303	05/24/16	0.58 J	0.79	--	--	--	< 10	--	--
EW-18	683303	08/18/16	< 0.62	0.82	--	--	--	< 0.50	--	--
EW-18	683303	11/03/16	< 0.64	0.82	--	--	--	--	1.3 J	--
MW-3B	478240	12/18/13	**102**	--	--	--	--	--	--	--
MW-3B FD	478240	12/18/13	**128**	--	--	--	--	--	--	--
MW-3B	478240	08/14/14	**687**	--	--	--	--	--	--	--
MW-3B	478240	08/17/16	**307**	--	--	--	--	--	--	--
MW-3B	478240	11/01/16	< 0.63	--	--	--	--	--	--	--
MW-3W	478217	08/17/16	--	--	--	--	--	--	--	**110**
MW-3W	478217	11/01/16	0.39 J	--	--	--	--	--	--	7.1
MW-9	478245	12/19/13	0.33 J	--	0.20 J	--	4.1	--	--	--
MW-9	478245	08/12/14	0.20 J	--	0.25 J	--	48.9	--	--	--
MW-9	478245	08/17/16	< 0.63 J	--	--	--	--	3.6	--	--
MW-9	478245	11/02/16	< 0.65	--	--	--	--	--	4.3	--
MW-11B	478230	04/25/13	**2070**	3.3	--	0.93	--	--	--	--
MW-11B FD	478230	04/25/13	**3420**	3.4	--	0.53	--	--	--	--
MW-11B	478230	12/16/13	**8640**	--	2.3	--	0.23 J	--	--	--
MW-11B	478230	08/13/14	--	--	1.6	--	13.8	--	--	--
MW-11B	478230	05/24/16	**2220**	0.54	--	--	--	< 10	--	--
MW-11B	478230	08/17/16	**5880**	1.1	--	--	--	0.025 J	--	11
MW-11B	478230	11/03/16	**5210**	0.64	--	--	--	--	< 0.050	0.65 J

Table 3
Groundwater Concentrations 2013 to Fall 2016
MacGillis and Gibbs

			Pentachlorophenol ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L	Total 2,3,7,8-TCDD Equivalence[a] pg/L
		Cleanup Goal:	1	5	5	100	100	100	100	12
Well Name	Unique Well ID	Date Sampled								
MW-11W	478222	04/25/13	< 23.3	0.73	--	**196**	--	--	--	--
MW-11W	478222	12/16/13	0.31 J	--	0.70	--	**120**	--	--	--
MW-11W	478222	08/13/14	--	--	0.82	--	**247**	--	--	--
MW-11W	478222	08/17/16	--	--	--	--	--	**314**	--	--
MW-11W	478222	11/03/16	--	--	--	--	--	--	**298**	**--**
MW-17B	515061	08/11/14	**222**	--	--	--	--	--	--	--
MW-17B	515061	08/17/16	**728**	--	--	--	--	--	--	1.2
MW-17B FD	515061	08/17/16	**707**	--	--	--	--	--	--	--
MW-17B	515061	11/04/16	**769**	--	--	--	--	--	--	0.34
MW-17B FD	515061	11/04/16	**727**	--	--	--	--	--	--	--
MW-19B	522741	12/19/13	**236**	--	0.97	--	0.87	--	--	--
MW-19B	522741	08/12/14	**78.8**	1.1	--	59.1	--	--	--	--
MW-19B	522741	05/27/15	**272**	1.1	1.1	1.5	14.3	--	--	--
MW-19B	522741	11/19/15	**188**	0.96	0.87	--	--	--	< 10	--
MW-19B	522741	05/24/16	**111**	0.74	--	--	--	< 10	--	--
MW-19B FD	522741	05/24/16	**85.4**	0.73	--	--	--	< 10	--	--
MW-19B	522741	08/17/16	**35.8**	0.74	--	--	--	1.2	--	--
MW-19B	522741	11/02/16	**135**	0.85	--	--	--	--	0.61 J	0.027
MW-20	522739	04/25/13	< 20.5	1.2	--	**1290**	--	--	--	--
MW-20	522739	12/19/13	**7.3**	1.0	--	**545**	--	--	--	--
MW-20	522739	08/13/14	**48.0**	1.1	--	**234**	--	--	--	--
MW-20	522739	05/28/15	**464**	1.0	1.1	77.2	84.1	--	--	--
MW-20	522739	11/19/15	**322**	1.0	0.86	93.9	75.9	--	79	--
MW-20 FD	522739	11/19/15	**241**	1.0	0.83	--	--	--	87	--
MW-20	522739	05/24/16	**293**	0.89	--	--	--	62	--	--
MW-20	522739	08/17/16	**36.6**	1.2	--	--	--	**450 J**	--	--
MW-20 FD	522739	08/17/16	**29.6**	1.1	--	--	--	**599 J**	--	--
MW-20	522739	11/03/16	**49.8**	1.1	--	--	--	--	**791**	0.07 J
MW-20 FD	522739	11/03/16	**47.0**	1.1	--	--	--	--	**827**	0.09 J

Table 3
Groundwater Concentrations 2013 to Fall 2016
MacGillis and Gibbs

			Pentachlorophenol ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L	Total 2,3,7,8-TCDD Equivalence[a] pg/L
		Cleanup Goal:	**1**	**5**	**5**	**100**	**100**	**100**	**100**	**12**
Well Name	**Unique Well ID**	**Date Sampled**								
MW-21B	522735	12/20/13	**34.3**	0.47 J	--	39.4	--	--	--	--
MW-21B	522735	08/14/14	**6.1**	--	0.57	--	16.9	--	--	--
MW-21B	522735	05/24/16	0.95	0.44 J	--	--	--	4.9	--	--
MW-21B	522735	08/17/16	**7.5 J**	0.51	--	--	--	10.8	--	--
MW-21B	522735	11/03/16	< 0.65	0.39 J	--	--	--	--	45.4	--
MW-21W	522734	12/20/13	**26.4**	0.42 J	--	0.35 J	--	--	--	--
MW-21W	522734	08/14/14	**13.0**	--	0.44 J	--	0.56	--	--	--
MW-21W	522734	11/19/15	**10.7**	0.39 J	0.30 J	--	--	--	< 10	--
MW-21W	522734	05/24/16	**13.9**	--	--	--	--	--	--	--
MW-21W	522734	08/17/16	**3.5 J**	0.39 J	--	--	--	< 0.50	--	--
MW-21W	522734	11/03/16	**19.7**	0.41 J	--	--	--	--	< 0.050	--
MW-23B	598356	08/14/14	**38.4**	--	0.55	--	1.2	--	--	--
MW-23B	598356	05/25/16	< 0.66	--	--	--	--	--	--	--
MW-23B	598356	08/19/16	< 0.62	--	--	--	--	--	--	--
MW-23B	598356	11/04/16	**23.1**	--	--	--	--	--	--	--
MW-24W	592323	05/29/15	**16.3**	--	--	--	--	--	--	--
MW-24W	592323	11/17/15	0.60	--	--	--	--	--	--	--
MW-24W	592323	08/18/16	**76.3 J**	--	--	--	--	--	--	--
MW-24W	592323	11/04/16	**23.1**	--	--	--	--	--	--	--
MW-26W	592301	12/18/13	0.32 J	--	--	--	--	--	--	--
MW-26W	592301	08/14/14	0.18 J	--	--	--	--	--	--	--
MW-26W	592301	05/28/15	< 0.32	--	--	--	--	--	--	--
MW-26W	592301	11/18/15	< 0.30	--	--	--	--	--	--	--
MW-26W	592301	05/23/16	< 0.64 J	--	--	--	--	--	--	--
MW-26W	592301	08/18/16	< 0.62 J	--	--	--	--	--	--	--
MW-26W	592301	11/01/16	< 0.64	--	--	--	--	--	--	--

Table 3
Groundwater Concentrations 2013 to Fall 2016
MacGillis and Gibbs

			Pentachlorophenol ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L	Total 2,3,7,8-TCDD Equivalence[a] pg/L
		Cleanup Goal:	1	5	5	100	100	100	100	12
Well Name	Unique Well ID	Date Sampled								
MW-103	619704	12/31/13	**1.2**	--	--	--	--	--	--	--
MW-103	619704	08/13/14	**1.5**	--	--	--	--	--	--	--
MW-103	619704	05/29/15	0.22 J	--	--	--	--	--	--	--
MW-103	619704	11/18/15	< 0.31	--	--	--	--	--	--	--
MW-103	619704	05/23/16	**2.2 B1**	--	--	--	--	--	--	--
MW-103	619704	08/19/16	< 0.62 J	--	--	--	--	--	--	--
MW-103	619704	11/02/16	< 0.62 J	--	--	--	--	--	--	--
MW-104	619705	12/30/13	**57.1**	--	--	--	--	--	--	--
MW-104	619705	08/13/14	**38.5**	--	--	--	--	--	--	--
MW-104	619705	05/28/15	**16.6**	--	--	--	--	--	--	--
MW-104	619705	11/18/15	**42.6**	--	--	--	--	--	--	--
MW-104	619705	05/23/16	0.69 B1	--	--	--	--	--	--	--
MW-104	619705	08/18/16	<1.3 J	--	--	--	--	--	--	--
MW-104	619705	11/02/16	**45.7 J**	--	--	--	--	--	--	--
MW-105	619709	12/30/13	**43.8**	--	--	--	--	--	--	--
MW-105	619709	08/13/14	**40.0**	--	--	--	--	--	--	--
MW-105	619709	05/28/15	**156**	--	--	--	--	--	--	--
MW-105	619709	11/19/15	**85.9**	--	--	--	--	--	--	--
MW-105	619709	05/23/16	**36.4**	--	--	--	--	--	--	--
MW-105 FD	619709	05/23/16	**48.6**	--	--	--	--	--	--	--
MW-105	619709	08/18/16	**11.7 J**	--	--	--	--	--	--	--
MW-105 FD	619709	08/18/16	**18.4**	--	--	--	--	--	--	--
MW-105	619709	11/02/16	**67.0 J**	--	--	--	--	--	--	--
MW-105 FD	619709	11/02/16	**71.3 J**	--	--	--	--	--	--	--
MW-106	619712	01/02/14	**7.3**	--	--	--	--	--	--	--
MW-106	619712	08/13/14	**3.4**	--	--	--	--	--	--	--
MW-106	619712	05/23/16	0.41 J	--	--	--	--	--	--	--
MW-106	619712	08/19/16	< 0.62	--	--	--	--	--	--	--
MW-106	619712	11/04/16	< 0.63	--	--	--	--	--	--	--

Table 3
Groundwater Concentrations 2013 to Fall 2016
MacGillis and Gibbs

			Pentachlorophenol ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L	Total 2,3,7,8-TCDD Equivalence[a] pg/L
		Cleanup Goal:	1	5	5	100	100	100	100	12
Well Name	Unique Well ID	Date Sampled								
MW-107	619713	12/10/13	**8.3**	--	--	--	--	--	--	--
MW-107	619713	08/13/14	**5.3**	--	--	--	--	--	--	--
MW-107	619713	05/28/15	**4.9**	--	--	--	--	--	--	--
MW-107	619713	11/18/15	**1.8**	--	--	--	--	--	--	--
MW-107	619713	05/23/16	< 0.61 J	--	--	--	--	--	--	--
MW-107	619713	08/19/16	**4.2**	--	--	--	--	--	--	--
MW-107	619713	11/04/16	0.60 J	--	--	--	--	--	--	--
MW-108	619714	12/20/13	**34.3**	--	--	--	--	--	--	--
MW-108	619714	05/28/15	**24.7**	--	--	--	--	--	--	--
MW-108	619714	08/13/14	0.92	--	--	--	--	--	--	--
MW-108	619714	11/17/15	**11.3**	--	--	--	--	--	--	--
MW-108	619714	05/23/16	**6.9 J**	--	--	--	--	--	--	--
MW-108 FD	619714	05/23/16	**2.2 J**	--	--	--	--	--	--	--
MW-108	619714	08/19/16	< 0.62	--	--	--	--	--	--	--
MW-108	619714	11/04/16	< 0.67	--	--	--	--	--	--	--
MW-110	619715	01/03/14	0.31 J	--	--	--	--	--	--	--
MW-110	619715	08/12/14	**3.9**	--	--	--	--	--	--	--
MW-110	619715	05/28/15	0.38	--	--	--	--	--	--	--
MW-110	619715	11/19/15	< 0.31	--	--	--	--	--	--	--
MW-110	619715	05/25/16	< 0.67	--	--	--	--	--	--	--
MW-110	619715	08/16/16	< 0.64	--	--	--	--	--	--	--
MW-110	619715	11/01/16	< 0.63	--	--	--	--	--	--	--
MW-111A	684901	12/31/13	0.30 J	--	--	--	--	--	--	--
MW-111A	684901	08/12/14	< 0.34	--	--	--	--	--	--	--
MW-111A	684901	05/29/15	< 0.32	--	--	--	--	--	--	--
MW-111A	684901	11/17/15	< 0.31	--	--	--	--	--	--	--
MW-111A	684901	05/25/16	< 0.68	--	--	--	--	--	--	--
MW-111A	684901	08/16/16	< 0.65	--	--	--	--	--	--	--
MW-111A	684901	11/01/16	< 0.62	--	--	--	--	--	--	--

Table 3
Groundwater Concentrations 2013 to Fall 2016
MacGillis and Gibbs

			Pentachlorophenol ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L	Total 2,3,7,8-TCDD Equivalence[a] pg/L
		Cleanup Goal:	1	5	5	100	100	100	100	12
Well Name	Unique Well ID	Date Sampled								
MW-113	619719	01/02/14	**7.1 J**	--	--	--	--	--	--	--
MW-113	619719	08/13/14	**4.2**	--	--	--	--	--	--	--
MW-113	619719	05/28/15	**2.0**	--	--	--	--	--	--	--
MW-113	619719	11/19/15	**4.1**	--	--	--	--	--	--	--
MW-113	619719	05/25/16	**2.7**	--	--	--	--	--	--	--
MW-113	619719	08/16/16	< 0.67	--	--	--	--	--	--	--
MW-113	619719	11/01/16	< 0.62	--	--	--	--	--	--	--
MW-117	619725	12/20/13	0.32 J	--	--	--	--	--	--	--
MW-117 FD	619725	12/20/13	0.32 J	--	--	--	--	--	--	--
MW-117	619725	08/14/14	0.16 J	--	--	--	--	--	--	--
MW-117	619725	05/27/15	0.21 J	--	--	--	--	--	--	--
MW-117	619725	11/17/15	< 0.31	--	--	--	--	--	--	--
MW-117	619725	05/23/16	0.84 JB1	--	--	--	--	--	--	--
MW-117	619725	08/18/16	< 0.63	--	--	--	--	--	--	--
MW-117	619725	11/01/16	< 0.62	--	--	--	--	--	--	--
MW-118	619726	12/30/13	**46.4**	--	--	--	--	--	--	--
MW-118	619726	08/13/14	**19.3**	--	--	--	--	--	--	--
MW-118	619726	05/28/15	**26.5**	--	--	--	--	--	--	--
MW-118	619726	11/18/15	**22.3**	--	--	--	--	--	--	--
MW-118 FD	619726	11/18/15	**19.0**	--	--	--	--	--	--	--
MW-118	619726	05/23/16	**23.4 J**	--	--	--	--	--	--	--
MW-118	619726	08/19/16	**34.8**	--	--	--	--	--	--	--
MW-118	619726	11/02/16	**33.0 J**	--	--	--	--	--	--	--
MW-119	619727	12/18/13	0.32 J	--	--	--	--	--	--	--
MW-119	619727	08/14/14	< 0.32	--	--	--	--	--	--	--
MW-119	619727	05/23/16	< 0.63 J	--	--	--	--	--	--	--
MW-119	619727	08/18/16	< 0.64	--	--	--	--	--	--	--
MW-119	619727	11/01/16	< 0.63	--	--	--	--	--	--	--
MW-121	619729	12/23/13	--	1.9	--	0.092 J	--	--	--	--
MW-121	619729	12/31/13	0.32 J	--	--	--	--	--	--	--
MW-121	619729	08/12/14	< 0.32	--	--	--	--	--	--	--
MW-121	619729	05/25/16	< 0.67	0.44 J	--	--	--	--	--	--
MW-121	619729	08/18/16	< 0.63	0.49 J	--	--	--	--	--	--
MW-121	619729	11/02/16	< 0.64	1.3	--	--	--	--	--	--

Table 3
Groundwater Concentrations 2013 to Fall 2016
MacGillis and Gibbs

			Pentachlorophenol ug/L	Arsenic Dissolved ug/L	Arsenic Total ug/L	Chromium Dissolved ug/L	Chromium Total ug/L	Chromium(VI) Dissolved ug/L	Chromium(VI) Total ug/L	Total 2,3,7,8-TCDD Equivalence[a] pg/L
		Cleanup Goal:	**1**	**5**	**5**	**100**	**100**	**100**	**100**	**12**
Well Name	**Unique Well ID**	**Date Sampled**								
MW-122	658172	05/03/13	< 22.0	1.7	--	< 0.50	--	--	--	--
MW-122	658172	01/03/14	< 0.51	--	--	--	--	--	--	--
MW-122	658172	05/29/15	< 0.30	--	--	--	--	--	--	--
MW-122	658172	11/17/15	< 0.31	--	--	--	--	--	--	--
MW-122	658172	05/24/16	< 0.62	--	--	--	--	--	--	--
MW-122	658172	08/16/16	< 0.67	--	--	--	--	--	--	--
MW-122	658172	11/01/16	< 0.62	--	--	--	--	--	--	--
MW-123	619730	01/03/14	0.32 J	--	--	--	--	--	--	--
MW-123	619730	05/29/15	< 0.32	--	--	--	--	--	--	--
MW-123	619730	11/20/15	< 0.31	**6.3**	**5.6**	--	--	--	< 10	--
MW-123	619730	05/25/16	< 0.67 J	**6.5**	--	--	--	--	--	--
MW-123	619730	08/16/16	< 0.67	**6.3**	--	--	--	--	--	--
MW-123	619730	11/02/16	0.33 J	**6.2**	--	--	--	--	--	--
MW-124	658173	04/25/13	< 20.6	2.1	--	< 0.50	--	--	--	--
MW-124	658173	08/19/16	< 0.63	--	--	--	--	--	--	--
MW-124	658173	11/04/16	< 0.64	--	--	--	--	--	--	--

Notes:

<XX - Less than the laboratory reporting limit

BOLD = Concentration exceeds the site clean up goal

- = Not analyzed for this parameter

B1 - Associated with laboratory method blank contamination

J = Estimated concentration

Well IDs:

"W" used in the suffix indicates the well screen in in a shallower zone

"B" is assigned to wells where the screen is near the base or near-bottom of the New Brighton aquifer

Table 4
Historical Ground Water Elevation

Well ID	Unique Well ID	Jun-12	Dec-12	Apr-13	May-13	Dec-13	Aug-14	May-15	Nov-15	May-16	Aug-16	Nov-16
EW-1	592308	889.54	NA	893.19	887.13	NA	NA	NA	NA	NA	894.98	896.39
EW-3B	683305	869.06	NA	887.99	880.83	NA	NA	888.29	888.81	886.56	886.92	888.87
EW-4	616507	892.56	NA	NA	NA	NA	895.08	NA	NA	NA	892.47	894.99
EW-5	623329	884.62	NA	893.6	893.62	NA	NA	894.6	895.15	894.96	893.76	895.48
EW-7	616483	889.44	NA	893.7	885.45	NA	NA	887.25	NA	NA	NA	896.82
EW-9	616485	882.61	NA	893.96	NA	NA	NA	NA	NA	NA	NA	890.98
EW-10	616486	880.26	NA	895.07	885.03	NA	NA	NA	NA	NA	NA	NA
EW-11	623340	872.26	NA	894.1	874.13	NA	NA	NA	NA	NA	NA	887.74
EW-12	628999	NA	893.56	NA	NA	NA	NA	895.76	896.8	896.94	897.56	898.34
EW-13	616512	NA	882.54	894.34	883.05	NA	NA	NA	NA	NA	NA	NA
EW-15	628907	NA	892.18	891.56	891.64	NA	NA	893	894.1	893.94	893.97	894.77
EW-16	628911	NA	893.2	893.15	893.22	NA	NA	893.82	895.14	896.07	895.91	896.7
EW-18	683303	NA	861.47	NA	NA	NA	NA	878.55	879.44	878.94	879.34	879.41
MW-1B	478224	893.61	NA	892.65	892.81	NA	895.41	NA	NA	NA	NA	NA
MW-1W	478215	894.46	NA	893.79	893.87	NA	897.09	NA	NA	NA	NA	898.04
MW-1H	478233	842.1	NA	842.78	843.03	NA	NA	NA	NA	NA	NA	NA
MW-2B	478225	895.13	NA	894.98	895.15	NA	898.25	NA	NA	NA	NA	NA
MW-2W	478216	895.82	NA	895.66	896.04	NA	900.05	NA	NA	NA	NA	899.96
MW-3B	478240	894.07	NA	895.3	894.53	NA	897.58	NA	NA	NA	897.75	898.48
MW-3W	478217	895.54	NA	895.41	895.75	NA	NA	NA	NA	NA	897.83	898.08
MW-3H	478239	840.09	NA	840.88	841.11	NA	NA	NA	NA	NA	NA	NA
MW-7B	478243	895.71	NA	NA	NA	NA	893.67	NA	NA	NA	NA	NA
MW-7W	478242	895.66	NA	NA	NA	NA	898.01	NA	NA	NA	NA	NA
MW-9	478245	895.93	NA	895.54	895.76	NA	896.9	NA	NA	NA	896.73	897.1
MW-11B	478230	892.81	NA	892.46	892.5	NA	894.88	NA	NA	894.51	893.51	895.62
MW-11H	478235	838.42	NA	838.89	839.29	NA	NA	NA	NA	NA	NA	NA
MW-11W	478222	893.06	NA	892.74	892.74	NA	894.93	NA	NA	NA	894.55	895.87
MW-14W	478250	892.68	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-14B	476390	892.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-15B	476389	894.83	NA	893.9	894.21	NA	NA	NA	NA	NA	NA	NA

Table 4
Historical Ground Water Elevation

Well ID	Unique Well ID	Jun-12	Dec-12	Apr-13	May-13	Dec-13	Aug-14	May-15	Nov-15	May-16	Aug-16	Nov-16
MW-15H	476387	838.4	NA	838.6	839.52	NA	NA	NA	NA	NA	NA	NA
MW-15W	476388	896.33	NA	895.83	896.28	NA	NA	NA	NA	NA	NA	898.27
MW-16H	478234	838.86	NA	839.18	839.74	NA	NA	NA	NA	NA	NA	NA
MW-16B	478232	893.79	NA	893.16	893.3	NA	895.76	NA	NA	NA	NA	NA
MW-17B	515061	895.2	NA	NA	NA	NA	898.13	NA	NA	NA	898.12	899.01
MW-17W	515060	895.23	NA	NA	NA	NA	898.12	NA	NA	NA	NA	NA
MW-18B	522737	894.23	NA	NA	894.38	NA	897.57	NA	NA	NA	NA	NA
MW-18W	522736	894.38	NA	NA	894.51	NA	897.77	NA	NA	NA	NA	898.43
MW-19B	522741	893.64	NA	893.69	893.93	NA	895.33	893.47	896.56	895.44	894.55	895.96
MW-19W	522740	893.77	NA	893.82	894.03	NA	895.16	NA	NA	NA	NA	896.06
MW-20	522739	889.18	NA	889.83	889.68	NA	889.73	889.96	890.51	890.31	888.21	889.8
MW-21B	522735	890.04	NA	890.27	890.29	NA	890.86	NA	NA	891.13	888.78	890.82
MW-21W	522734	888.74	NA	889.94	889.56	NA	888.88	889.6	891.76	889.57	887.67	889.25
MW-21B	522735	890.04	NA	890.27	890.29	NA	NA	NA	NA	NA	NA	NA
MW-22	522733	891.05	NA	NA	NA	NA	892.71	NA	NA	NA	NA	NA
MW-23B	598356	886.3	NA	887.74	887.43	NA	886.55	NA	NA	888.05	886.88	887.57
MW-23W	598357	886.49	NA	887.66	887.9	NA	886.21	NA	NA	NA	NA	887.43
MW-24B	592324	896.82	NA	NA	NA	NA	897.97	NA	NA	NA	NA	NA
MW-24W	592323	897.28	NA	NA	NA	NA	NA	NA	902.43	NA	900.89	899.35
MW-25B	590924	891.52	NA	890.68	890.65	NA	893.31	NA	NA	NA	NA	NA
MW-25W	590923	891.63	NA	890.73	890.79	NA	894.44	NA	NA	NA	NA	893.64
MW-26B	590925	876.95	NA	877.78	877.28	NA	877.2	NA	NA	NA	NA	NA
MW-26W	592301	877.35	NA	878.26	877.67	NA	877.41	877.8	879.33	878.08	878.62	878.48
MW-27B	592303	881.29	NA	880.84	881.05	NA	882.42	NA	NA	NA	NA	NA
MW-27W	592302	881.76	NA	881.12	881.4	NA	880.76	NA	NA	NA	NA	882.88
MW-101	619710	895.59	NA	894.25	894.47	NA	NA	NA	NA	NA	NA	897.91
MW-102	619711	894.54	NA	893.61	893.85	NA	896	NA	NA	NA	NA	897.16
MW-103	619704	894.01	NA	893.24	893.52	NA	NA	894.73	896.29	895.41	895.98	896.75

Table 4
Historical Ground Water Elevation

Well ID	Unique Well ID	Jun-12	Dec-12	Apr-13	May-13	Dec-13	Aug-14	May-15	Nov-15	May-16	Aug-16	Nov-16
MW-104	619705	888.9	NA	888.4	888.53	NA	890.91	889.71	890.86	890.27	890.56	891.22
MW-105	619709	888.48	NA	888.05	888.22	NA	890.42	889.2	890.27	NA	889.91	890.5
MW-106	619712	895.18	NA	894.35	894.43	NA	891.57	NA	NA	896.88	897.47	898.33
MW-107	619713	895.33	NA	894.48	894.71	NA	897.12	895.79	898.04	899.07	897.69	898.36
MW-108	619714	895.11	NA	894	894.27	NA	896.38	895.46	897.31	896.79	897.01	897.83
MW-109	619718	893.58	NA	892.91	893.08	NA	895.92	NA	NA	NA	NA	896.64
MW-110	619715	892.37	NA	891.78	891.89	NA	894.34	893.15	894.58	894.38	894.21	894.88
MW-111A	684901	881.3	NA	880.8	881.02	NA	NA	881.76	882.9	882.37	882.56	883.16
MW-112	619716	881.53	NA	880.89	881.1	NA	882.56	NA	NA	NA	NA	883.26
MW-113	619719	893.83	NA	893.11	893.23	NA	895.83	894.56	896.17	895.86	895.84	896.67
MW-114	619703	894.66	NA	893.83	894.09	NA	896.88	NA	NA	NA	NA	897.24
MW-115	619702	893.51	NA	893.08	893.18	NA	895.88	NA	NA	NA	NA	895.8
MW-117	619725	876.64	NA	877.1	876.94	NA	876.3	876.68	877.96	876.89	877.34	877.13
MW-118	619726	878.47	NA	879.14	878.61	NA	879.14	878.84	880.41	879.09	879.6	879.55
MW-119	619727	877.75	NA	878.55	878.12	NA	877.59	NA	NA	878.22	878.86	878.59
MW-120	619728	878.82	NA	879.35	879.04	NA	NA	NA	NA	NA	NA	879.56
MW-121	619729	889.14	NA	NA	NA	NA	889.72	NA	NA	890.42	887.81	889.83
MW-122	658172	842.17	NA	842.04	842.38	NA	NA	841.46	847.05	839.49	847.66	848.33
MW-123	619730	882.33	NA	883.14	883.29	NA	883.1	883.71	884.76	881.77	882.41	883.85
MW-124	658173	886.99	NA	887.75	NA	NA	NA	NA	NA	NA	887.05	887.68
Notes:	Elevation in feet											
		Level taken from remediation well adjacent to the Extraction Well										
		Groundwater Elevation Post Extraction Well Shutdown										

Appendix 1

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

November 14, 2016

Andrew Tarara
AECOM
800 LaSalle Avenue, Suite 500
Minneapolis, MN 55402

RE: Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Dear Andrew Tarara:
Enclosed are the analytical results for sample(s) received by the laboratory on November 02, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

cc: Petros Paulos, AECOM

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
Alaska Certification UST-107
525 N 8th Street, Salina, KS 67401
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10368467001	**MW-110**	Water	11/01/16 10:37	11/02/16 16:18
10368467002	**MW-111A**	Water	11/01/16 12:25	11/02/16 16:18
10368467003	**MW-113**	Water	11/01/16 11:33	11/02/16 16:18
10368467004	**MW-122**	Water	11/01/16 09:35	11/02/16 16:18
10368467005	**MW-3W**	Water	11/01/16 15:00	11/02/16 16:18
10368467006	**MW-3B**	Water	11/01/16 14:20	11/02/16 16:18
10368467007	**MW-26W**	Water	11/01/16 17:07	11/02/16 16:18
10368467008	**MW-117**	Water	11/01/16 17:50	11/02/16 16:18
10368467009	**MW-119**	Water	11/01/16 16:30	11/02/16 16:18
10368467010	**MW-9**	Water	11/02/16 10:00	11/02/16 16:18
10368467011	**MW-19B**	Water	11/02/16 12:22	11/02/16 16:18
10368467012	**MW-121**	Water	11/02/16 11:25	11/02/16 16:18
10368467013	**EW-5**	Water	11/02/16 09:07	11/02/16 16:18
10368467014	**EW-1**	Water	11/02/16 14:12	11/02/16 16:18
10368467015	**EW-3B**	Water	11/02/16 15:13	11/02/16 16:18
10368467016	**DUP-4**	Water	11/02/16 00:00	11/02/16 16:18

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(612)607-1700

SAMPLE ANALYTE COUNT

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10368467001	**MW-110**	EPA 8270D by SIM	JLR	2	PASI-M
10368467002	**MW-111A**	EPA 8270D by SIM	JLR	2	PASI-M
10368467003	**MW-113**	EPA 8270D by SIM	JLR	2	PASI-M
10368467004	**MW-122**	EPA 8270D by SIM	JLR	2	PASI-M
10368467005	**MW-3W**	EPA 8270D by SIM	JLR	2	PASI-M
10368467006	**MW-3B**	EPA 8270D by SIM	JLR	2	PASI-M
10368467007	**MW-26W**	EPA 8270D by SIM	JLR	2	PASI-M
10368467008	**MW-117**	EPA 8270D by SIM	JLR	2	PASI-M
10368467009	**MW-119**	EPA 8270D by SIM	JLR	2	PASI-M
10368467010	**MW-9**	Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368467011	**MW-19B**	EPA 6020A	RJS	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368467012	**MW-121**	EPA 6020A	RJS	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368467013	**EW-5**	EPA 6020A	RJS	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368467014	**EW-1**	EPA 6020A	RJS	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368467015	**EW-3B**	EPA 6020A	RJS	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368467016	**DUP-4**	EPA 6020A	RJS	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M

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Minneapolis, MN 55414
(612)607-1700

SUMMARY OF DETECTION

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
10368467005	**MW-3W**					
EPA 8270D by SIM	Pentachlorophenol	0.39J	ug/L	0.64	11/11/16 18:07	
10368467010	**MW-9**					
Pace SOP	Chromium, Hexavalent	4.3	ug/L	0.050	11/03/16 14:23	M1, N2
10368467011	**MW-19B**					
EPA 6020A	Arsenic, Dissolved	0.85	ug/L	0.50	11/09/16 19:24	
Pace SOP	Chromium, Hexavalent	0.61	ug/L	0.050	11/03/16 14:28	N2
EPA 8270D by SIM	Pentachlorophenol	135	ug/L	65.2	11/11/16 12:53	
10368467012	**MW-121**					
EPA 6020A	Arsenic, Dissolved	1.3	ug/L	0.50	11/09/16 19:33	
10368467013	**EW-5**					
EPA 6020A	Arsenic, Dissolved	0.53	ug/L	0.50	11/09/16 19:29	
Pace SOP	Chromium, Hexavalent	0.079	ug/L	0.050	11/03/16 14:33	N2
10368467014	**EW-1**					
EPA 6020A	Arsenic, Dissolved	2.3	ug/L	0.50	11/09/16 20:05	
Pace SOP	Chromium, Hexavalent	115	ug/L	2.5	11/03/16 15:24	N2
10368467015	**EW-3B**					
EPA 6020A	Arsenic, Dissolved	6.4	ug/L	0.50	11/09/16 20:09	
10368467016	**DUP-4**					
EPA 6020A	Arsenic, Dissolved	6.2	ug/L	0.50	11/09/16 20:14	
Pace SOP	Chromium, Hexavalent	0.017J	ug/L	0.050	11/03/16 14:50	N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Method: **EPA 6020A**
Description: 6020A MET ICPMS, Dissolved
Client: AECOM MN ND
Date: November 14, 2016

General Information:
6 samples were analyzed for EPA 6020A. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3020 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Method: **Pace SOP**
Description: LC-ICPMS Speciated Chromium
Client: AECOM MN ND
Date: November 14, 2016

General Information:
6 samples were analyzed for Pace SOP. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 444992

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10368467010

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 2430140)
  - Chromium, Hexavalent

Additional Comments:

Analyte Comments:

QC Batch: 444992

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 2430139)
  - Chromium, Hexavalent
- MSD (Lab ID: 2430140)
  - Chromium, Hexavalent

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- BLANK (Lab ID: 2430136)
  - Chromium, Hexavalent

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PROJECT NARRATIVE

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Method: **Pace SOP**
Description: LC-ICPMS Speciated Chromium
Client: AECOM MN ND
Date: November 14, 2016

Analyte Comments:

QC Batch: 444992

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- DUP-4 (Lab ID: 10368467016)
  - Chromium, Hexavalent
- EW-1 (Lab ID: 10368467014)
  - Chromium, Hexavalent
- EW-3B (Lab ID: 10368467015)
  - Chromium, Hexavalent
- EW-5 (Lab ID: 10368467013)
  - Chromium, Hexavalent
- LCS (Lab ID: 2430137)
  - Chromium, Hexavalent
- MS (Lab ID: 2430139)
  - Chromium, Hexavalent
- MSD (Lab ID: 2430140)
  - Chromium, Hexavalent
- MW-19B (Lab ID: 10368467011)
  - Chromium, Hexavalent
- MW-9 (Lab ID: 10368467010)
  - Chromium, Hexavalent

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Method: **EPA 8270D by SIM**
Description: 8270D MSSV PCP by SIM
Client: AECOM MN ND
Date: November 14, 2016

General Information:
16 samples were analyzed for EPA 8270D by SIM. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3510C with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

QC Batch: 445618

S4: Surrogate recovery not evaluated against control limits due to sample dilution.

- MW-19B (Lab ID: 10368467011)
  - 2,4,6-Tribromophenol (S)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: MW-110 **Lab ID: 10368467001** Collected: 11/01/16 10:37 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.63	0.30	1	11/07/16 12:54	11/11/16 16:46	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	88	%.	46-125		1	11/07/16 12:54	11/11/16 16:46	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: MW-111A **Lab ID: 10368467002** Collected: 11/01/16 12:25 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	11/07/16 12:54	11/11/16 17:06	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	83	%.	46-125		1	11/07/16 12:54	11/11/16 17:06	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: MW-113 **Lab ID: 10368467003** Collected: 11/01/16 11:33 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	11/07/16 12:54	11/11/16 17:26	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	85	%.	46-125		1	11/07/16 12:54	11/11/16 17:26	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: MW-122 **Lab ID: 10368467004** Collected: 11/01/16 09:35 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	11/07/16 12:54	11/11/16 17:46	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	82	%.	46-125		1	11/07/16 12:54	11/11/16 17:46	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: MW-3W **Lab ID: 10368467005** Collected: 11/01/16 15:00 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**0.39J**	ug/L	0.64	0.30	1	11/07/16 12:54	11/11/16 18:07	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	96	%.	46-125		1	11/07/16 12:54	11/11/16 18:07	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: MW-3B **Lab ID: 10368467006** Collected: 11/01/16 14:20 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.63	0.30	1	11/07/16 12:54	11/11/16 18:27	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	86	%.	46-125		1	11/07/16 12:54	11/11/16 18:27	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: MW-26W **Lab ID: 10368467007** Collected: 11/01/16 17:07 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.64	0.30	1	11/07/16 12:54	11/11/16 18:47	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	86	%.	46-125		1	11/07/16 12:54	11/11/16 18:47	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: MW-117 **Lab ID: 10368467008** Collected: 11/01/16 17:50 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	11/07/16 12:54	11/11/16 19:07	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	83	%.	46-125		1	11/07/16 12:54	11/11/16 19:07	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: MW-119 **Lab ID: 10368467009** Collected: 11/01/16 16:30 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.63	0.30	1	11/07/16 12:54	11/11/16 19:27	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	80	%.	46-125		1	11/07/16 12:54	11/11/16 19:27	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: MW-9 **Lab ID: 10368467010** Collected: 11/02/16 10:00 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**4.3**	ug/L	0.050	0.014	1		11/03/16 14:23		M1,N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.65	0.30	1	11/07/16 12:54	11/11/16 19:48	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	94	%.	46-125		1	11/07/16 12:54	11/11/16 19:48	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: MW-19B **Lab ID: 10368467011** Collected: 11/02/16 12:22 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.85**	ug/L	0.50	0.091	1	11/08/16 11:54	11/09/16 19:24	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**0.61**	ug/L	0.050	0.014	1		11/03/16 14:28		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**135**	ug/L	65.2	30.8	100	11/07/16 12:54	11/11/16 12:53	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	0	%.	46-125		100	11/07/16 12:54	11/11/16 12:53	118-79-6	S4

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ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: MW-121 **Lab ID: 10368467012** Collected: 11/02/16 11:25 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**1.3**	ug/L	0.50	0.091	1	11/08/16 11:54	11/09/16 19:33	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.64	0.30	1	11/07/16 12:54	11/11/16 15:45	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	51	%.	46-125		1	11/07/16 12:54	11/11/16 15:45	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: EW-5 **Lab ID: 10368467013** Collected: 11/02/16 09:07 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.53**	ug/L	0.50	0.091	1	11/08/16 11:54	11/09/16 19:29	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**0.079**	ug/L	0.050	0.014	1		11/03/16 14:33		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	11/07/16 12:54	11/11/16 20:08	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	84	%.	46-125		1	11/07/16 12:54	11/11/16 20:08	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: EW-1 **Lab ID: 10368467014** Collected: 11/02/16 14:12 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**2.3**	ug/L	0.50	0.091	1	11/08/16 11:54	11/09/16 20:05	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**115**	ug/L	2.5	0.72	50		11/03/16 15:24		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.63	0.30	1	11/07/16 12:54	11/11/16 20:28	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	74	%.	46-125		1	11/07/16 12:54	11/11/16 20:28	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: EW-3B **Lab ID: 10368467015** Collected: 11/02/16 15:13 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**6.4**	ug/L	0.50	0.091	1	11/08/16 11:54	11/09/16 20:09	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**<0.014**	ug/L	0.050	0.014	1		11/03/16 14:42		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.61	0.29	1	11/07/16 12:54	11/11/16 20:48	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	80	%.	46-125		1	11/07/16 12:54	11/11/16 20:48	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Sample: DUP-4 **Lab ID: 10368467016** Collected: 11/02/16 00:00 Received: 11/02/16 16:18 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**6.2**	ug/L	0.50	0.091	1	11/08/16 11:54	11/09/16 20:14	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**0.017J**	ug/L	0.050	0.014	1		11/03/16 14:50		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.31**	ug/L	0.67	0.31	1	11/07/16 12:54	11/11/16 21:08	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	86	%.	46-125		1	11/07/16 12:54	11/11/16 21:08	118-79-6	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

QC Batch: 444992 Analysis Method: Pace SOP
QC Batch Method: Pace SOP Analysis Description: LC-ICPMS Speciation
Associated Lab Samples: 10368467010, 10368467011, 10368467013, 10368467014, 10368467015, 10368467016

METHOD BLANK: 2430136 Matrix: Water
Associated Lab Samples: 10368467010, 10368467011, 10368467013, 10368467014, 10368467015, 10368467016

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chromium, Hexavalent	ug/L	<0.014	0.050	0.014	11/03/16 14:14	N2

LABORATORY CONTROL SAMPLE: 2430137

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	ug/L	.5	0.50	101	80-120	N2

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2430139 2430140

Parameter	Units	10368467010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Hexavalent	ug/L	4.3	.5	.5	4.7	4.6	85	59	75-125	3	20	E,M1, N2

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QUALITY CONTROL DATA

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

QC Batch: 445096 Analysis Method: EPA 6020A
QC Batch Method: EPA 3020 Analysis Description: 6020A Water Dissolved UPD4
Associated Lab Samples: 10368467011, 10368467012, 10368467013, 10368467014, 10368467015, 10368467016

METHOD BLANK: 2430986 Matrix: Water
Associated Lab Samples: 10368467011, 10368467012, 10368467013, 10368467014, 10368467015, 10368467016

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	ug/L	<0.091	0.50	0.091	11/09/16 19:15	

LABORATORY CONTROL SAMPLE: 2430987

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	ug/L	100	103	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2430988 2430989

Parameter	Units	10368467012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	ug/L	1.3	100	100	98.8	104	98	103	75-125	5	20	

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QUALITY CONTROL DATA

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

QC Batch: 445618 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3510C Analysis Description: 8270D PCP MSSV
Associated Lab Samples: 10368467001, 10368467002, 10368467003, 10368467004, 10368467005, 10368467006, 10368467007, 10368467008, 10368467009, 10368467010, 10368467011, 10368467012, 10368467013, 10368467014, 10368467015, 10368467016

METHOD BLANK: 2434089 Matrix: Water
Associated Lab Samples: 10368467001, 10368467002, 10368467003, 10368467004, 10368467005, 10368467006, 10368467007, 10368467008, 10368467009, 10368467010, 10368467011, 10368467012, 10368467013, 10368467014, 10368467015, 10368467016

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Pentachlorophenol	ug/L	<0.28	0.60	0.28	11/11/16 08:30	
2,4,6-Tribromophenol (S)	%.	79	46-125		11/11/16 08:30	

LABORATORY CONTROL SAMPLE: 2434090

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Pentachlorophenol	ug/L	1	0.75	75	30-125	
2,4,6-Tribromophenol (S)	%.			87	46-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2434091 2434092

Parameter	Units	10368467012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Pentachlorophenol	ug/L	<0.30	1.1	1	0.33J	0.38J	31	37	30-125		30	
2,4,6-Tribromophenol (S)	%.						74	74	46-125			

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
N2	The lab does not hold NELAC/TNI accreditation for this parameter.
S4	Surrogate recovery not evaluated against control limits due to sample dilution.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60436248 M&G Quarterly Samplin
Pace Project No.: 10368467

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10368467011	**MW-19B**	EPA 3020	445096	EPA 6020A	446140
10368467012	**MW-121**	EPA 3020	445096	EPA 6020A	446140
10368467013	**EW-5**	EPA 3020	445096	EPA 6020A	446140
10368467014	**EW-1**	EPA 3020	445096	EPA 6020A	446140
10368467015	**EW-3B**	EPA 3020	445096	EPA 6020A	446140
10368467016	**DUP-4**	EPA 3020	445096	EPA 6020A	446140
10368467010	**MW-9**	Pace SOP	444992		
10368467011	**MW-19B**	Pace SOP	444992		
10368467013	**EW-5**	Pace SOP	444992		
10368467014	**EW-1**	Pace SOP	444992		
10368467015	**EW-3B**	Pace SOP	444992		
10368467016	**DUP-4**	Pace SOP	444992		
10368467001	**MW-110**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467002	**MW-111A**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467003	**MW-113**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467004	**MW-122**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467005	**MW-3W**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467006	**MW-3B**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467007	**MW-26W**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467008	**MW-117**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467009	**MW-119**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467010	**MW-9**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467011	**MW-19B**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467012	**MW-121**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467013	**EW-5**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467014	**EW-1**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467015	**EW-3B**	EPA 3510C	445618	EPA 8270D by SIM	446562
10368467016	**DUP-4**	EPA 3510C	445618	EPA 8270D by SIM	446562

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10368467

Page: 1 of 2

2146517

Section A
Required Client Information:

- Company: AECOM
- Address: 800 LaSalle Ave suite 500 Minneapolis, MN, 55402
- Email To: andrew.tarara@AECOM.com
- Phone: 612-376-2000 Fax:
- Requested Due Date/TAT: STd

Section B
Required Project Information:

- Report To: Drew Tarara
- Copy To: Petros.Pavlos@AECOM.com
- Purchase Order No.:
- Project Name: MSG Quarterly Sampling
- Project Number: 60436248

Section C
Invoice Information:

- Attention: Same
- Company Name:
- Address:
- Pace Quote Reference:
- Pace Project Manager: Carol Davy
- Pace Profile #: 27489

REGULATORY AGENCY

- ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
- ☐ UST ☐ RCRA ☐ OTHER ______

Site Location STATE: ______

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes MATRIX / CODE: Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Tissue TS, Other OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test ↓ Y/N	PCP- 8270D By SIM	Dioxin 1613	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-110					11-1-16	10:37		2	2									X			001
2	MW-111A					11-1-16	12:25		2	2									X			002
3	MW-113					11-1-16	11:33		2	2									X			003
4	MW-122					11-1-16	9:35		2	2									X			004
5	MW-3W					11-1-16	15:00		4	4									X	X		005
6	MW-3B					11-1-16	14:20		2	2									X			006
7	MW-26W					11-1-16	17:07		2	2									X			007
8	MW 117					11-1-16	17:50		2	2									X			008
9	MW 119					11-1-16	16:38		2	2									X			009
10																						
11																						
12																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
Arsenic samples Field Filtered method 6020A										
Hex Chrome SM 3500-Cr D modified				[signature] PACE	11-2-16	1618	0.7 1.8	Y	N	Y
PCP by 8270D by SIM	Petros Pavlos / AECOM	11-2-16	16-18				3.9 4.8 5.8			
Dioxin by 1613										

SAMPLE CONDITIONS

ORIGINAL

SAMPLER NAME AND SIGNATURE

- PRINT Name of SAMPLER: Petros Pavlos
- SIGNATURE of SAMPLER: [signature]
- DATE Signed (MM/DD/YY): 11-2-16

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

2146518

Section A Required Client Information:

Company: AECOM
Address: 800 LaSalle Ave Suite 500
Minneapolis, MN 55402
Email To: andrew.tarara@AECOM.com
Phone: 612-376-2000 Fax:
Requested Due Date/TAT: 5T

Section B Required Project Information:

Report To: Andrew Tarara
Copy To: petros.pavlos@AECOM.com
Purchase Order No.:
Project Name: MLG Quarterly Sampling
Project Number: 60436298

Section C Invoice Information:

Attention: Same
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #: 27489 #1

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____
Site Location STATE: _____

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: PCB 8270D by SIM	Dissolved Arsenic 6020A	Hex Chrom SM 3500 Cr modified	Dioxin by 1613	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-9					11-2-16	10:00		3	2		1						X		X			010
2	MW-19B					11-2-16	12:22		6	5		1						X	X	X	#	X		011
3	MW-121					11-2-16	11:25		3	2		1						X	X					012
4	EW-5					11-2-16	9:07		4	3		1						X	X	X				013
5	EW-1					11-2-16	14:12		4	3		1						X	X	X				014
6	MW-121 MS-1					11-2-16	11:25		2	2								X						012
7	MW-121 MSD-2					11-2-16	11:25		2	2								X						012
8	~~EW-3B~~ EW-3B					11-2-16	15:13		4	3		1						X	X	X				015
9	Dup 4								4	3		1						X	X	X				016
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Arsenic is Field Filtered for metals 6020A						
Hex Chrome method SM 3500-Cr D modified						
PCB by 8270D by SIM	Petros Pavlos/AECOM	11-2-16		[signature] DAVE	11-2-16	1610
Dioxin by 1613	[signature]	11-2-16	16:16			

SAMPLE CONDITIONS

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
0.7 1.8 3.9 4.8	Y	N	Y

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Petros Pavlos
SIGNATURE of SAMPLER: [signature]
DATE Signed (MM/DD/YY): 11-2-16

ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: AECOM

Project #: WO# : 10368467

10368467

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☒ No **Seals Intact?** ☐ Yes ☒ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☒ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermometer Used: ☒ 151401163 ☐ B88A912167504 ☐ 151401164 ☐ B88A0143310098

Type of Ice: ☒ Wet ☐ Blue ☐ None ☒ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.9, 4.5, 4.8, 3.9 **Cooler Temp Corrected (°C):** 8.3

Biological Tissue Frozen? ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Correction Factor:** -0.1 **Date and Initials of Person Examining Contents:** JE 11/2/16

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☒ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☒ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10. 11/2/16 MS
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☒ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No	☐ N/A	12. OUT of temp cooler Sampled 11-2-16
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☒ Yes	☐ No	☐ N/A	Sample # 11-14-16 1/1 11/2/16 MS
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☒ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution: Cooling started on samples collected and received 11/2/16

Project Manager Review: Carol Doug **Date:** 11/3/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

www.pacelabs.com

Report Prepared for:

Andrew Tarara
AECOM
800 LaSalle Avenue, Suite 500
Minneapolis MN 55402

REPORT OF LABORATORY ANALYSIS FOR PCDD/PCDF

Report Information:

Pace Project #: 10368468
Sample Receipt Date: 11/02/2016
Client Project #: 60436248
Client Sub PO #: 30000
State Cert #: 027-053-137

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

This report has been reviewed by:

November 18, 2016

Scott Unze, Project Manager
(612) 607-6383
(612) 607-6444 (fax)
scott.unze@pacelabs.com

Report Prepared Date:
November 18, 2016

Report of Laboratory Analysis

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

DISCUSSION

This report presents the results from the analyses performed on two samples submitted by a representative of AECOM. The samples were analyzed for the presence or absence of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using USEPA Method 1613B. The reporting limits were based on signal-to-noise measurements. Estimated Maximum Possible Concentration (EMPC) values were treated as positives in the toxic equivalence calculations. This report was revised to provide results for all tetra through octa-chlorinated PCDDs and PCDFs.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extracts ranged from 54-99%. All of the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1613B. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for variation in recovery and accurate values were obtained.

Values were flagged "I" where incorrect isotope ratios were obtained. Concentrations below the calibration range were flagged "J" and should be regarded as estimates.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to contain trace levels of selected congeners. These levels were below the calibration range of the method. The OCDD concentration reported for field sample MW-19B was similar to the corresponding blank level, flagged "B" on the results table, and may be, at least partially, attributed to the background. It should be noted that levels less than ten times the background are not generally considered to be statistically different from the background.

Laboratory spike samples were also prepared with the sample batch using clean water that had been fortified with native standard materials. The results show that the spiked native compounds were recovered at 83-120% with relative percent differences of 0.0-7.8%. These results were within the target ranges for the method. Matrix spikes were not prepared with the sample batch.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE	MN002
California	01155CA	New York (NEL	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

REPORT OF LABORATORY ANALYSIS

Report No.....10368468

Appendix A

Sample Management

Report No.....10368468_1613B Revision 1 Page 5 of 15

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CHAIN-OF-CUSTODY / Analytical Request Document

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10368468

Page: 1 of 2

2146517

Section A Required Client Information:

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Address: 800 LaSalle Ave Suite 500
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Requested Due Date/TAT: STD

Section B Required Project Information:

Report To: Drew Tarara
Copy To: Petros Paulos@AECOM.com
Purchase Order No.:
Project Name: MSG Quarterly Sampli
Project Number: 60436248

Section C Invoice Information:

Attention: Same
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #: 27489

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE:

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: PCP 8270D By SIM	Dioxin 1613	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-110					11-1-16	10:37		2	2								X			
2	MW-111A					11-1-16	12:25		2	2								X			
3	MW-113					11-1-16	11:33		2	2								X			
4	MW-122					11-1-16	9:35		2	2								X			
5	MW-3W					11-1-16	15:00		4	4								X	X		001
6	MW-3R					11-1-16	14:20		2	2								X			
7	MW-26W					11-1-16	17:07		2	2								X			
8	MW 117					11-1-16	17:50		2	2								X			
9	MW 119					11-1-16	16:38		2	2								X			
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
Arsenic Samples										
Field Filtered method 6020A										
Hex. Chrome SM 3500-Cr D modified				[signature] PACE	11-2-16	1618	0.1 1.9	Y	N	Y
PCP by 8270D by SIM	Petros Paulos/AECOM	11-2-16	1618				3.9 4.4			
Dioxin by 1613							5.0			

2

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Petros Paulos

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-2-16

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Report No....10368468_1613B Revision 1 Page 6 of 15

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10368468

Page: 1 of 2

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Requested Due Date/TAT: 5T

Section B Required Project Information:

Report To: Andrew Tarara
Copy To: Petros.Paulos@AECOM.com
Purchase Order No.:
Project Name: MLG Quarterly Sampling
Project Number: 60436298

Section C Invoice Information:

Attention: Same
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #: 27499 #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER MLG

Site Location STATE:

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / , -) Sample IDs MUST BE UNIQUE

Matrix Codes MATRIX / CODE

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: PCP By 8270D by SIM	Dissolved Arsenic 6020	Hex Chrom SM 3500	Cr modified	Dioxin by 1613	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-9					11-2-16	10:06		3	2		1						X		X				
2	MW-19B					11-2-16	12:22		6	5		1						X	X	X	# X			002
3	MW-12I					11-2-16	11:25		3	2		1						X	X					DOT 11216 MT
4	EW-5					11-2-16	9:07		4	3		1						X	X	X				
5	EW-1					11-2-16	14:18		4	3		1						X	X	X				
6	MW-12I MS-1					11-2-16	11:25		2	2								X						
7	MW-12I MSD-2					11-2-16	11:25		2	2								X						
8	~~EW-3~~ EW-3B					11-2-16	15:13		4	3		1						X	X	X				
9	Dup 4								4	3		1						X	X	X				
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
Arsenic is Field Filtered tot metal 6020A										
Hex Chrome. method SM 3500-Cr D modified										
PCP by 8270D by SIM	Petros Paulos/AECOM	11-2-16		[illegible] DATE	11-2-16	1618	0.7	Y	N	Y
Dioxin by 1613	[signature]	11-2-16	16:18				4.8			

2

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Petros Paulos
SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-2-16

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt **Client Name:** AECOM **Project #:** WO# : 10368468

10368468

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No **Optional:** Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☐ 151401163 ☐ 151401164 ☐ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.8, 1.9, 3.9, 4.8 **Cooler Temp Corrected (°C):** 0.7, 1.9, 3.4, 4.8 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** -0.1 **Date and Initials of Person Examining Contents:** 11-21-16 MS

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: Scott Unze **Date:** 11/3/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Reporting Flags

A = Reporting Limit based on signal to noise

B = Less than 10x higher than method blank level

C = Result obtained from confirmation analysis

D = Result obtained from analysis of diluted sample

E = Exceeds calibration range

I = Interference present

J = Estimated value

Nn = Value obtained from additional analysis

P = PCDE Interference

R = Recovery outside target range

S = Peak saturated

U = Analyte not detected

V = Result verified by confirmation analysis

X = %D Exceeds limits

Y = Calculated using average of daily RFs

* = See Discussion

Appendix B

Sample Analysis Summary

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Sample Analysis Results

Client - AECOM

Client's Sample ID	MW-3W		
Lab Sample ID	10368468001		
Filename	U161111B_13		
Injected By	BAL		
Total Amount Extracted	937 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	11/01/2016 15:00
ICAL ID	U161025	Received	11/02/2016 16:18
CCal Filename(s)	U161111A_16	Extracted	11/08/2016 16:14
Method Blank ID	BLANK-52710	Analyzed	11/12/2016 07:57

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	1.40		2,3,7,8-TCDF-13C	2.00	82
Total TCDF	ND	-----	1.40		2,3,7,8-TCDD-13C	2.00	98
					1,2,3,7,8-PeCDF-13C	2.00	80
2,3,7,8-TCDD	ND	-----	0.64		2,3,4,7,8-PeCDF-13C	2.00	82
Total TCDD	ND	-----	0.64		1,2,3,7,8-PeCDD-13C	2.00	91
					1,2,3,4,7,8-HxCDF-13C	2.00	81
1,2,3,7,8-PeCDF	ND	-----	1.40		1,2,3,6,7,8-HxCDF-13C	2.00	78
2,3,4,7,8-PeCDF	1.4	-----	0.83	J	2,3,4,6,7,8-HxCDF-13C	2.00	85
Total PeCDF	11.0	-----	1.10	J	1,2,3,7,8,9-HxCDF-13C	2.00	84
					1,2,3,4,7,8-HxCDD-13C	2.00	87
1,2,3,7,8-PeCDD	ND	-----	0.44		1,2,3,6,7,8-HxCDD-13C	2.00	68
Total PeCDD	7.9	-----	0.44	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	75
					1,2,3,4,7,8,9-HpCDF-13C	2.00	80
1,2,3,4,7,8-HxCDF	6.5	-----	0.40	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	85
1,2,3,6,7,8-HxCDF	ND	-----	0.28		OCDD-13C	4.00	61
2,3,4,6,7,8-HxCDF	ND	-----	0.33				
1,2,3,7,8,9-HxCDF	ND	-----	0.37		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	100.0	-----	0.34		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	2.2	-----	0.65	J	2,3,7,8-TCDD-37Cl4	0.20	104
1,2,3,6,7,8-HxCDD	7.8	-----	0.67	J			
1,2,3,7,8,9-HxCDD	-----	1.8	0.76	IJ			
Total HxCDD	78.0	-----	0.69				
1,2,3,4,6,7,8-HpCDF	87.0	-----	1.20		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	6.3	-----	1.20	J	Equivalence: 7.1 pg/L		
Total HpCDF	450.0	-----	1.20		(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	290.0	-----	0.88				
Total HpCDD	1100.0	-----	0.88				
OCDF	450.0	-----	2.00				
OCDD	2900.0	-----	2.10				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
EDL = Estimated Detection Limit

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

J = Estimated value
I = Interference present

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Sample Analysis Results

Client - AECOM

Client's Sample ID	MW-19B		
Lab Sample ID	10368468002		
Filename	U161111B_14		
Injected By	BAL		
Total Amount Extracted	938 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	11/02/2016 12:22
ICAL ID	U161025	Received	11/02/2016 16:18
CCal Filename(s)	U161111A_16	Extracted	11/08/2016 16:14
Method Blank ID	BLANK-52710	Analyzed	11/12/2016 08:43

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.47		2,3,7,8-TCDF-13C	2.00	88
Total TCDF	0.83	-----	0.47	J	2,3,7,8-TCDD-13C	2.00	99
					1,2,3,7,8-PeCDF-13C	2.00	80
2,3,7,8-TCDD	ND	-----	0.63		2,3,4,7,8-PeCDF-13C	2.00	84
Total TCDD	ND	-----	0.63		1,2,3,7,8-PeCDD-13C	2.00	94
					1,2,3,4,7,8-HxCDF-13C	2.00	85
1,2,3,7,8-PeCDF	ND	-----	0.54		1,2,3,6,7,8-HxCDF-13C	2.00	80
2,3,4,7,8-PeCDF	ND	-----	0.32		2,3,4,6,7,8-HxCDF-13C	2.00	89
Total PeCDF	ND	-----	0.43		1,2,3,7,8,9-HxCDF-13C	2.00	86
					1,2,3,4,7,8-HxCDD-13C	2.00	87
1,2,3,7,8-PeCDD	ND	-----	0.53		1,2,3,6,7,8-HxCDD-13C	2.00	75
Total PeCDD	ND	-----	0.53		1,2,3,4,6,7,8-HpCDF-13C	2.00	74
					1,2,3,4,7,8,9-HpCDF-13C	2.00	73
1,2,3,4,7,8-HxCDF	ND	-----	0.35		1,2,3,4,6,7,8-HpCDD-13C	2.00	81
1,2,3,6,7,8-HxCDF	ND	-----	0.29		OCDD-13C	4.00	54
2,3,4,6,7,8-HxCDF	ND	-----	0.23				
1,2,3,7,8,9-HxCDF	ND	-----	0.32		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	-----	0.30		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	0.35		2,3,7,8-TCDD-37Cl4	0.20	98
1,2,3,6,7,8-HxCDD	ND	-----	0.42				
1,2,3,7,8,9-HxCDD	ND	-----	0.41				
Total HxCDD	ND	-----	0.40				
1,2,3,4,6,7,8-HpCDF	ND	-----	0.43		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	0.67		Equivalence: 0.027 pg/L		
Total HpCDF	ND	-----	0.55		(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	-----	1.5	0.80	IJ			
Total HpCDD	ND	-----	0.80				
OCDF	ND	-----	1.30				
OCDD	38.00	-----	1.50	BJ			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
EDL = Estimated Detection Limit

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

J = Estimated value
B = Less than 10x higher than method blank level
I = Interference present

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Blank Analysis Results

Lab Sample ID	BLANK-52710	Matrix	Water
Filename	U161110C_11	Dilution	NA
Total Amount Extracted	988 mL	Extracted	11/08/2016 16:14
ICAL ID	U161025	Analyzed	11/11/2016 05:35
CCal Filename(s)	U161110B_16	Injected By	SMT

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.29	2,3,7,8-TCDF-13C	2.00	81
Total TCDF	ND	-----	0.29	2,3,7,8-TCDD-13C	2.00	92
				1,2,3,7,8-PeCDF-13C	2.00	81
2,3,7,8-TCDD	ND	-----	0.42	2,3,4,7,8-PeCDF-13C	2.00	86
Total TCDD	ND	-----	0.42	1,2,3,7,8-PeCDD-13C	2.00	91
				1,2,3,4,7,8-HxCDF-13C	2.00	77
1,2,3,7,8-PeCDF	ND	-----	0.48	1,2,3,6,7,8-HxCDF-13C	2.00	75
2,3,4,7,8-PeCDF	ND	-----	0.30	2,3,4,6,7,8-HxCDF-13C	2.00	83
Total PeCDF	ND	-----	0.39	1,2,3,7,8,9-HxCDF-13C	2.00	81
				1,2,3,4,7,8-HxCDD-13C	2.00	81
1,2,3,7,8-PeCDD	ND	-----	0.39	1,2,3,6,7,8-HxCDD-13C	2.00	72
Total PeCDD	ND	-----	0.39	1,2,3,4,6,7,8-HpCDF-13C	2.00	72
				1,2,3,4,7,8,9-HpCDF-13C	2.00	69
1,2,3,4,7,8-HxCDF	ND	-----	0.37	1,2,3,4,6,7,8-HpCDD-13C	2.00	79
1,2,3,6,7,8-HxCDF	ND	-----	0.36	OCDD-13C	4.00	56
2,3,4,6,7,8-HxCDF	ND	-----	0.26			
1,2,3,7,8,9-HxCDF	ND	-----	0.30	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	-----	0.32	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	0.40	2,3,7,8-TCDD-37Cl4	0.20	95
1,2,3,6,7,8-HxCDD	ND	-----	0.40			
1,2,3,7,8,9-HxCDD	ND	-----	0.39			
Total HxCDD	ND	-----	0.39			
1,2,3,4,6,7,8-HpCDF	ND	-----	0.52	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	0.60	Equivalence: 0.0014 pg/L		
Total HpCDF	ND	-----	0.56	(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	ND	-----	0.74			
Total HpCDD	0.88	-----	0.74 J			
OCDF	ND	-----	0.88			
OCDD	4.60	-----	2.00 J			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
EDL = Estimated Detection Limit

J = Estimated value

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-52711		
Filename	U161110C_02	Matrix	Water
Total Amount Extracted	989 mL	Dilution	NA
ICAL ID	U161025	Extracted	11/08/2016 16:14
CCal Filename	U161110B_16	Analyzed	11/10/2016 22:41
Method Blank ID	BLANK-52710	Injected By	SMT

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	10.0	7.5	15.8	100
2,3,7,8-TCDD	10	8.3	6.7	15.8	83
1,2,3,7,8-PeCDF	50	51	40.0	67.0	101
2,3,4,7,8-PeCDF	50	54	34.0	80.0	108
1,2,3,7,8-PeCDD	50	49	35.0	71.0	98
1,2,3,4,7,8-HxCDF	50	54	36.0	67.0	108
1,2,3,6,7,8-HxCDF	50	54	42.0	65.0	108
2,3,4,6,7,8-HxCDF	50	50	35.0	78.0	100
1,2,3,7,8,9-HxCDF	50	51	39.0	65.0	102
1,2,3,4,7,8-HxCDD	50	53	35.0	82.0	107
1,2,3,6,7,8-HxCDD	50	56	38.0	67.0	111
1,2,3,7,8,9-HxCDD	50	56	32.0	81.0	112
1,2,3,4,6,7,8-HpCDF	50	52	41.0	61.0	103
1,2,3,4,7,8,9-HpCDF	50	47	39.0	69.0	94
1,2,3,4,6,7,8-HpCDD	50	50	35.0	70.0	99
OCDF	100	100	63.0	170.0	102
OCDD	100	110	78.0	144.0	110
2,3,7,8-TCDD-37Cl4	10	8.0	3.1	19.1	80
2,3,7,8-TCDF-13C	100	68	22.0	152.0	68
2,3,7,8-TCDD-13C	100	80	20.0	175.0	80
1,2,3,7,8-PeCDF-13C	100	76	21.0	192.0	76
2,3,4,7,8-PeCDF-13C	100	82	13.0	328.0	82
1,2,3,7,8-PeCDD-13C	100	89	21.0	227.0	89
1,2,3,4,7,8-HxCDF-13C	100	78	19.0	202.0	78
1,2,3,6,7,8-HxCDF-13C	100	73	21.0	159.0	73
2,3,4,6,7,8-HxCDF-13C	100	83	22.0	176.0	83
1,2,3,7,8,9-HxCDF-13C	100	83	17.0	205.0	83
1,2,3,4,7,8-HxCDD-13C	100	83	21.0	193.0	83
1,2,3,6,7,8-HxCDD-13C	100	72	25.0	163.0	72
1,2,3,4,6,7,8-HpCDF-13C	100	75	21.0	158.0	75
1,2,3,4,7,8,9-HpCDF-13C	100	78	20.0	186.0	78
1,2,3,4,6,7,8-HpCDD-13C	100	82	26.0	166.0	82
OCDD-13C	200	130	26.0	397.0	63

Cs = Concentration Spiked (ng/mL)
Cr = Concentration Recovered (ng/mL)
Rec. = Recovery (Expressed as Percent)
Control Limit Reference: Method 1613, Table 6, 10/94 Revision
R = Recovery outside of control limits
Nn = Value obtained from additional analysis
* = See Discussion

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCSD-52712		
Filename	U161110C_03	Matrix	Water
Total Amount Extracted	973 mL	Dilution	NA
ICAL ID	U161025	Extracted	11/08/2016 16:14
CCal Filename	U161110B_16	Analyzed	11/10/2016 23:27
Method Blank ID	BLANK-52710	Injected By	SMT

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	10	7.5	15.8	103
2,3,7,8-TCDD	10	8.9	6.7	15.8	89
1,2,3,7,8-PeCDF	50	53	40.0	67.0	105
2,3,4,7,8-PeCDF	50	54	34.0	80.0	108
1,2,3,7,8-PeCDD	50	50	35.0	71.0	100
1,2,3,4,7,8-HxCDF	50	56	36.0	67.0	111
1,2,3,6,7,8-HxCDF	50	52	42.0	65.0	104
2,3,4,6,7,8-HxCDF	50	53	35.0	78.0	105
1,2,3,7,8,9-HxCDF	50	54	39.0	65.0	108
1,2,3,4,7,8-HxCDD	50	56	35.0	82.0	113
1,2,3,6,7,8-HxCDD	50	60	38.0	67.0	120
1,2,3,7,8,9-HxCDD	50	59	32.0	81.0	118
1,2,3,4,6,7,8-HpCDF	50	55	41.0	61.0	110
1,2,3,4,7,8,9-HpCDF	50	49	39.0	69.0	98
1,2,3,4,6,7,8-HpCDD	50	49	35.0	70.0	98
OCDF	100	100	63.0	170.0	104
OCDD	100	110	78.0	144.0	114
2,3,7,8-TCDD-37Cl4	10	9.4	3.1	19.1	94
2,3,7,8-TCDF-13C	100	80	22.0	152.0	80
2,3,7,8-TCDD-13C	100	91	20.0	175.0	91
1,2,3,7,8-PeCDF-13C	100	79	21.0	192.0	79
2,3,4,7,8-PeCDF-13C	100	84	13.0	328.0	84
1,2,3,7,8-PeCDD-13C	100	88	21.0	227.0	88
1,2,3,4,7,8-HxCDF-13C	100	78	19.0	202.0	78
1,2,3,6,7,8-HxCDF-13C	100	76	21.0	159.0	76
2,3,4,6,7,8-HxCDF-13C	100	83	22.0	176.0	83
1,2,3,7,8,9-HxCDF-13C	100	82	17.0	205.0	82
1,2,3,4,7,8-HxCDD-13C	100	82	21.0	193.0	82
1,2,3,6,7,8-HxCDD-13C	100	72	25.0	163.0	72
1,2,3,4,6,7,8-HpCDF-13C	100	74	21.0	158.0	74
1,2,3,4,7,8,9-HpCDF-13C	100	75	20.0	186.0	75
1,2,3,4,6,7,8-HpCDD-13C	100	83	26.0	166.0	83
OCDD-13C	200	120	26.0	397.0	58

Cs = Concentration Spiked (ng/mL)
Cr = Concentration Recovered (ng/mL)
Rec. = Recovery (Expressed as Percent)
Control Limit Reference: Method 1613, Table 6, 10/94 Revision
R = Recovery outside of control limits
Nn = Value obtained from additional analysis
* = See Discussion

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B

Spike Recovery Relative Percent Difference (RPD) Results

Client	AECOM		
Spike 1 ID	LCS-52711	Spike 2 ID	LCSD-52712
Spike 1 Filename	U161110C_02	Spike 2 Filename	U161110C_03

Compound	Spike 1 %REC	Spike 2 %REC	%RPD
2,3,7,8-TCDF	100	103	3.0
2,3,7,8-TCDD	83	89	7.0
1,2,3,7,8-PeCDF	101	105	3.9
2,3,4,7,8-PeCDF	108	108	0.0
1,2,3,7,8-PeCDD	98	100	2.0
1,2,3,4,7,8-HxCDF	108	111	2.7
1,2,3,6,7,8-HxCDF	108	104	3.8
2,3,4,6,7,8-HxCDF	100	105	4.9
1,2,3,7,8,9-HxCDF	102	108	5.7
1,2,3,4,7,8-HxCDD	107	113	5.5
1,2,3,6,7,8-HxCDD	111	120	7.8
1,2,3,7,8,9-HxCDD	112	118	5.2
1,2,3,4,6,7,8-HpCDF	103	110	6.6
1,2,3,4,7,8,9-HpCDF	94	98	4.2
1,2,3,4,6,7,8-HpCDD	99	98	1.0
OCDF	102	104	1.9
OCDD	110	114	3.6

%REC = Percent Recovered
RPD = The difference between the two values divided by the mean value

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

November 15, 2016

Andrew Tarara
AECOM
800 LaSalle Avenue, Suite 500
Minneapolis, MN 55402

RE: Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Dear Andrew Tarara:
Enclosed are the analytical results for sample(s) received by the laboratory on November 03, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

cc: Petros Paulos, AECOM

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
Alaska Certification UST-107
525 N 8th Street, Salina, KS 67401
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10368583001	**MW 123**	Water	11/02/16 16:56	11/03/16 14:03
10368583002	**MW 118**	Water	11/02/16 18:18	11/03/16 14:03
10368583003	**MW 104**	Water	11/02/16 19:41	11/03/16 14:03
10368583004	**Dup-3**	Water	11/02/16 00:00	11/03/16 14:03
10368583005	**MW-11B**	Water	11/03/16 08:35	11/03/16 14:03
10368583006	**MW-11W**	Water	11/03/16 08:13	11/03/16 14:03
10368583007	**EW-11**	Water	11/03/16 08:45	11/03/16 14:03
10368583008	**MW-20**	Water	11/03/16 09:39	11/03/16 14:03
10368583009	**Dup-2**	Water	11/03/16 00:00	11/03/16 14:03
10368583010	**MW-21W**	Water	11/03/16 11:10	11/03/16 14:03
10368583011	**MW-21B**	Water	11/03/16 10:40	11/03/16 14:03
10368583012	**EW-4**	Water	11/03/16 12:02	11/03/16 14:03
10368583013	**EW-7**	Water	11/03/16 12:53	11/03/16 14:03
10368583014	**MW-103**	Water	11/02/16 17:40	11/03/16 14:03
10368583015	**MW 105**	Water	11/02/16 19:01	11/03/16 14:03

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SAMPLE ANALYTE COUNT

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10368583001	**MW 123**	EPA 6020A	RJS	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368583002	**MW 118**	EPA 8270D by SIM	JLR	2	PASI-M
10368583003	**MW 104**	EPA 8270D by SIM	JLR	2	PASI-M
10368583004	**Dup-3**	EPA 8270D by SIM	JLR	2	PASI-M
10368583005	**MW-11B**	EPA 6020A	RJS	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368583006	**MW-11W**	Pace SOP	TT3	1	PASI-M
10368583007	**EW-11**	EPA 8270D by SIM	JLR	2	PASI-M
10368583008	**MW-20**	EPA 6020A	RJS	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368583009	**Dup-2**	EPA 6020A	RJS	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368583010	**MW-21W**	EPA 6020A	RJS	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368583011	**MW-21B**	EPA 6020A	RJS	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368583012	**EW-4**	EPA 6020A	RJS	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368583013	**EW-7**	Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368583014	**MW-103**	EPA 8270D by SIM	JLR	2	PASI-M
10368583015	**MW 105**	EPA 8270D by SIM	JLR	2	PASI-M

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SUMMARY OF DETECTION

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
10368583001	**MW 123**					
EPA 6020A	Arsenic, Dissolved	6.2	ug/L	0.50	11/09/16 20:18	
EPA 8270D by SIM	Pentachlorophenol	0.33J	ug/L	0.67	11/12/16 17:49	
10368583002	**MW 118**					
EPA 8270D by SIM	Pentachlorophenol	33.0	ug/L	6.8	11/14/16 16:01	
10368583003	**MW 104**					
EPA 8270D by SIM	Pentachlorophenol	45.7	ug/L	6.3	11/14/16 16:22	
10368583004	**Dup-3**					
EPA 8270D by SIM	Pentachlorophenol	71.3	ug/L	6.4	11/14/16 16:42	
10368583005	**MW-11B**					
EPA 6020A	Arsenic, Dissolved	0.64	ug/L	0.50	11/09/16 20:22	
EPA 8270D by SIM	Pentachlorophenol	5210	ug/L	622	11/14/16 15:01	
10368583006	**MW-11W**					
Pace SOP	Chromium, Hexavalent	298	ug/L	5.0	11/03/16 16:43	N2
10368583007	**EW-11**					
EPA 8270D by SIM	Pentachlorophenol	1090	ug/L	124	11/14/16 18:23	
10368583008	**MW-20**					
EPA 6020A	Arsenic, Dissolved	1.1	ug/L	0.50	11/11/16 23:22	
Pace SOP	Chromium, Hexavalent	791	ug/L	50.0	11/03/16 16:48	N2
EPA 8270D by SIM	Pentachlorophenol	49.8	ug/L	6.2	11/14/16 17:02	
10368583009	**Dup-2**					
EPA 6020A	Arsenic, Dissolved	1.1	ug/L	0.50	11/14/16 10:43	
Pace SOP	Chromium, Hexavalent	827	ug/L	50.0	11/03/16 16:52	N2
EPA 8270D by SIM	Pentachlorophenol	47.0	ug/L	6.3	11/14/16 17:22	
10368583010	**MW-21W**					
EPA 6020A	Arsenic, Dissolved	0.41J	ug/L	0.50	11/14/16 10:48	
EPA 8270D by SIM	Pentachlorophenol	19.7	ug/L	3.2	11/14/16 18:03	
10368583011	**MW-21B**					
EPA 6020A	Arsenic, Dissolved	0.39J	ug/L	0.50	11/09/16 20:40	
Pace SOP	Chromium, Hexavalent	45.4	ug/L	1.0	11/03/16 16:57	N2
10368583012	**EW-4**					
EPA 6020A	Arsenic, Dissolved	0.72	ug/L	0.50	11/11/16 23:48	
Pace SOP	Chromium, Hexavalent	7.6	ug/L	0.25	11/03/16 17:01	N2
10368583013	**EW-7**					
Pace SOP	Chromium, Hexavalent	44.4	ug/L	1.0	11/03/16 17:06	M6, N2
EPA 8270D by SIM	Pentachlorophenol	42.8	ug/L	6.3	11/14/16 17:42	
10368583015	**MW 105**					
EPA 8270D by SIM	Pentachlorophenol	67.0	ug/L	6.3	11/14/16 15:41	

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Method: **EPA 6020A**
Description: 6020A MET ICPMS, Dissolved
Client: AECOM MN ND
Date: November 15, 2016

General Information:
7 samples were analyzed for EPA 6020A. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3020 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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1700 Elm Street - Suite 200
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PROJECT NARRATIVE

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Method: **Pace SOP**
Description: LC-ICPMS Speciated Chromium
Client: AECOM MN ND
Date: November 15, 2016

General Information:
8 samples were analyzed for Pace SOP. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 445059

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10368583013

M6: Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

- MS (Lab ID: 2430470)
  - Chromium, Hexavalent

Additional Comments:

Analyte Comments:

QC Batch: 445059

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- BLANK (Lab ID: 2430467)
  - Chromium, Hexavalent
- Dup-2 (Lab ID: 10368583009)
  - Chromium, Hexavalent
- EW-4 (Lab ID: 10368583012)
  - Chromium, Hexavalent
- EW-7 (Lab ID: 10368583013)
  - Chromium, Hexavalent

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Method: **Pace SOP**
Description: LC-ICPMS Speciated Chromium
Client: AECOM MN ND
Date: November 15, 2016

Analyte Comments:

QC Batch: 445059

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- LCS (Lab ID: 2430468)
  - Chromium, Hexavalent
- MS (Lab ID: 2430470)
  - Chromium, Hexavalent
- MSD (Lab ID: 2430471)
  - Chromium, Hexavalent
- MW-11B (Lab ID: 10368583005)
  - Chromium, Hexavalent
- MW-11W (Lab ID: 10368583006)
  - Chromium, Hexavalent
- MW-20 (Lab ID: 10368583008)
  - Chromium, Hexavalent
- MW-21B (Lab ID: 10368583011)
  - Chromium, Hexavalent
- MW-21W (Lab ID: 10368583010)
  - Chromium, Hexavalent

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(612)607-1700

PROJECT NARRATIVE

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Method: **EPA 8270D by SIM**
Description: 8270D MSSV PCP by SIM
Client: AECOM MN ND
Date: November 15, 2016

General Information:
14 samples were analyzed for EPA 8270D by SIM. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3510C with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

QC Batch: 445789

S4: Surrogate recovery not evaluated against control limits due to sample dilution.

- EW-11 (Lab ID: 10368583007)
  - 2,4,6-Tribromophenol (S)
- MW-11B (Lab ID: 10368583005)
  - 2,4,6-Tribromophenol (S)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: MW 123 **Lab ID: 10368583001** Collected: 11/02/16 16:56 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**6.2**	ug/L	0.50	0.091	1	11/08/16 11:54	11/09/16 20:18	7440-38-2	
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**0.33J**	ug/L	0.67	0.31	1	11/08/16 08:15	11/12/16 17:49	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	88	%.	46-125		1	11/08/16 08:15	11/12/16 17:49	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: MW 118 **Lab ID: 10368583002** Collected: 11/02/16 18:18 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**33.0**	ug/L	6.8	3.2	10	11/08/16 08:15	11/14/16 16:01	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	97	%.	46-125		10	11/08/16 08:15	11/14/16 16:01	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: MW 104 **Lab ID: 10368583003** Collected: 11/02/16 19:41 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**45.7**	ug/L	6.3	3.0	10	11/08/16 08:15	11/14/16 16:22	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	85	%.	46-125		10	11/08/16 08:15	11/14/16 16:22	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: Dup-3 **Lab ID: 10368583004** Collected: 11/02/16 00:00 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**71.3**	ug/L	6.4	3.0	10	11/08/16 08:15	11/14/16 16:42	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	99	%.	46-125		10	11/08/16 08:15	11/14/16 16:42	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: MW-11B **Lab ID: 10368583005** Collected: 11/03/16 08:35 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.64**	ug/L	0.50	0.091	1	11/08/16 11:54	11/09/16 20:22	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**<0.014**	ug/L	0.050	0.014	1		11/03/16 15:48		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**5210**	ug/L	622	293	1000	11/08/16 08:15	11/14/16 15:01	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	0	%.	46-125		1000	11/08/16 08:15	11/14/16 15:01	118-79-6	S4

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ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: MW-11W **Lab ID: 10368583006** Collected: 11/03/16 08:13 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**298**	ug/L	5.0	1.4	100		11/03/16 16:43		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: EW-11 **Lab ID: 10368583007** Collected: 11/03/16 08:45 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**1090**	ug/L	124	58.4	200	11/08/16 08:15	11/14/16 18:23	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	0	%.	46-125		200	11/08/16 08:15	11/14/16 18:23	118-79-6	S4

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: MW-20 **Lab ID: 10368583008** Collected: 11/03/16 09:39 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**1.1**	ug/L	0.50	0.091	1	11/08/16 11:54	11/11/16 23:22	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**791**	ug/L	50.0	14.4	1000		11/03/16 16:48		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**49.8**	ug/L	6.2	2.9	10	11/08/16 08:15	11/14/16 17:02	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	91	%.	46-125		10	11/08/16 08:15	11/14/16 17:02	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: Dup-2 **Lab ID: 10368583009** Collected: 11/03/16 00:00 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**1.1**	ug/L	0.50	0.091	1	11/08/16 11:54	11/14/16 10:43	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**827**	ug/L	50.0	14.4	1000		11/03/16 16:52		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**47.0**	ug/L	6.3	2.9	10	11/08/16 08:15	11/14/16 17:22	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	91	%.	46-125		10	11/08/16 08:15	11/14/16 17:22	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: MW-21W **Lab ID: 10368583010** Collected: 11/03/16 11:10 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.41J**	ug/L	0.50	0.091	1	11/08/16 11:54	11/14/16 10:48	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**<0.014**	ug/L	0.050	0.014	1		11/03/16 16:06		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**19.7**	ug/L	3.2	1.5	5	11/08/16 08:15	11/14/16 18:03	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	98	%.	46-125		5	11/08/16 08:15	11/14/16 18:03	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: MW-21B **Lab ID: 10368583011** Collected: 11/03/16 10:40 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.39J**	ug/L	0.50	0.091	1	11/08/16 11:54	11/09/16 20:40	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**45.4**	ug/L	1.0	0.29	20		11/03/16 16:57		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.65	0.30	1	11/08/16 08:15	11/14/16 13:19	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	65	%.	46-125		1	11/08/16 08:15	11/14/16 13:19	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: EW-4 **Lab ID: 10368583012** Collected: 11/03/16 12:02 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.72**	ug/L	0.50	0.091	1	11/08/16 11:54	11/11/16 23:48	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**7.6**	ug/L	0.25	0.072	5		11/03/16 17:01		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.63	0.30	1	11/08/16 08:15	11/14/16 13:40	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	94	%.	46-125		1	11/08/16 08:15	11/14/16 13:40	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: EW-7 **Lab ID: 10368583013** Collected: 11/03/16 12:53 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**44.4**	ug/L	1.0	0.29	20		11/03/16 17:06		M6,N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**42.8**	ug/L	6.3	2.9	10	11/08/16 08:15	11/14/16 17:42	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	90	%.	46-125		10	11/08/16 08:15	11/14/16 17:42	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: MW-103 **Lab ID: 10368583014** Collected: 11/02/16 17:40 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	11/08/16 08:15	11/14/16 14:00	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	86	%.	46-125		1	11/08/16 08:15	11/14/16 14:00	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Sample: MW 105 **Lab ID: 10368583015** Collected: 11/02/16 19:01 Received: 11/03/16 14:03 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**67.0**	ug/L	6.3	3.0	10	11/08/16 08:15	11/14/16 15:41	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	82	%.	46-125		10	11/08/16 08:15	11/14/16 15:41	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

QC Batch: 445059 Analysis Method: Pace SOP
QC Batch Method: Pace SOP Analysis Description: LC-ICPMS Speciation
Associated Lab Samples: 10368583005, 10368583006, 10368583008, 10368583009, 10368583010, 10368583011, 10368583012, 10368583013

METHOD BLANK: 2430467 Matrix: Water
Associated Lab Samples: 10368583005, 10368583006, 10368583008, 10368583009, 10368583010, 10368583011, 10368583012, 10368583013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chromium, Hexavalent	ug/L	<0.014	0.050	0.014	11/03/16 16:25	N2

LABORATORY CONTROL SAMPLE: 2430468

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	ug/L	.5	0.55	109	80-120	N2

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2430470 2430471

Parameter	Units	10368583013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Hexavalent	ug/L	44.4	10	10	51.7	52.6	73	82	75-125	2	20	M6,N2

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

QC Batch: 445096 Analysis Method: EPA 6020A
QC Batch Method: EPA 3020 Analysis Description: 6020A Water Dissolved UPD4
Associated Lab Samples: 10368583001, 10368583005, 10368583008, 10368583009, 10368583010, 10368583011, 10368583012

METHOD BLANK: 2430986 Matrix: Water
Associated Lab Samples: 10368583001, 10368583005, 10368583008, 10368583009, 10368583010, 10368583011, 10368583012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	ug/L	<0.091	0.50	0.091	11/09/16 19:15	

LABORATORY CONTROL SAMPLE: 2430987

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	ug/L	100	103	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2430988 2430989

Parameter	Units	10368467012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	ug/L	1.3	100	100	98.8	104	98	103	75-125	5	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

QC Batch: 445789 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3510C Analysis Description: 8270D PCP MSSV
Associated Lab Samples: 10368583001, 10368583002, 10368583003, 10368583004, 10368583005, 10368583007, 10368583008, 10368583009, 10368583010, 10368583011, 10368583012, 10368583013, 10368583014, 10368583015

METHOD BLANK: 2435935 Matrix: Water
Associated Lab Samples: 10368583001, 10368583002, 10368583003, 10368583004, 10368583005, 10368583007, 10368583008, 10368583009, 10368583010, 10368583011, 10368583012, 10368583013, 10368583014, 10368583015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Pentachlorophenol	ug/L	<0.28	0.60	0.28	11/12/16 17:09	
2,4,6-Tribromophenol (S)	%.	89	46-125		11/12/16 17:09	

LABORATORY CONTROL SAMPLE: 2435936

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Pentachlorophenol	ug/L	1	0.66	66	30-125	
2,4,6-Tribromophenol (S)	%.			88	46-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2435937 2435938

Parameter	Units	10368663002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Pentachlorophenol	ug/L	<0.31	1.1	1.1	0.57J	0.52J	41	38	30-125		30	
2,4,6-Tribromophenol (S)	%.						83	85	46-125			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
N2	The lab does not hold NELAC/TNI accreditation for this parameter.
S4	Surrogate recovery not evaluated against control limits due to sample dilution.

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60436248 Macgillis & Gibbs Qua
Pace Project No.: 10368583

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10368583001	**MW 123**	EPA 3020	445096	EPA 6020A	446140
10368583005	**MW-11B**	EPA 3020	445096	EPA 6020A	446140
10368583008	**MW-20**	EPA 3020	445096	EPA 6020A	446140
10368583009	**Dup-2**	EPA 3020	445096	EPA 6020A	446140
10368583010	**MW-21W**	EPA 3020	445096	EPA 6020A	446140
10368583011	**MW-21B**	EPA 3020	445096	EPA 6020A	446140
10368583012	**EW-4**	EPA 3020	445096	EPA 6020A	446140
10368583005	**MW-11B**	Pace SOP	445059		
10368583006	**MW-11W**	Pace SOP	445059		
10368583008	**MW-20**	Pace SOP	445059		
10368583009	**Dup-2**	Pace SOP	445059		
10368583010	**MW-21W**	Pace SOP	445059		
10368583011	**MW-21B**	Pace SOP	445059		
10368583012	**EW-4**	Pace SOP	445059		
10368583013	**EW-7**	Pace SOP	445059		
10368583001	**MW 123**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368583002	**MW 118**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368583003	**MW 104**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368583004	**Dup-3**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368583005	**MW-11B**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368583007	**EW-11**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368583008	**MW-20**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368583009	**Dup-2**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368583010	**MW-21W**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368583011	**MW-21B**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368583012	**EW-4**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368583013	**EW-7**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368583014	**MW-103**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368583015	**MW 105**	EPA 3510C	445789	EPA 8270D by SIM	446746

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10368583

Page: 1 of 2

2106889

Section A Required Client Information:

Company: AECOM
Address: 800 La Salle Ave, Suite 500
Minneapolis, MN 55402
Email To: andrew.tarara@AECOM.com
Phone: 612-376-2000 Fax:
Requested Due Date/TAT: Std

Section B Required Project Information:

Report To: Drew Tarara
Copy To: Petros.Paulos@AECOM.com
Purchase Order No.:
Project Name: MacGillis & Gibbs Quarterly Sampling
Project Number: 60436248

Section C Invoice Information:

Attention: Same
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #: 27489 #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE:

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes MATRIX / CODE

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: PAP by 8270D SIM	Aqueous Arsenic 6020A	Hex Chrome SM 3500-Cr D mod.	Dioxin by 1613	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW 103					11-2-16	16:56		3	2		1					X	X				001
2	MW 118					11-2-16	18:18		2	2							X					002
3	MW 105					11-2-16	19:01		2	2							X					015 CAD
4	MW 104					11-2-16	19:41		2	2							X					003
5	Dup-3					11-2-16			2	2							X					004
6	MW-11B					11-3-16	8:35		6	5		1					X	X	X	X		005
7	MW-11W					11-3-16	8:13		1	1									X			006
8	EW-11					11-3-16	8:45		4	4							X			X		007
9	MW-20					11-3-16	9:39		6	5		1					X	X	X	X		008
10	Dup-2					11-3-16			6	5		1					X	X	X	X		009
11	MW-21W					11-3-16	11:10		4	3		1					X	X	X			010
12	MW-21B					11-3-16	10:40		4	3		1					X	X	X			011

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
- All Arsenic Samples Field Filtered & method 6020A				Pace	11-3-16	1403	8.8	Y	N	Y
- PAP method 8270D by SIM	Petros / AECOM	11-3-16	14:00				4.4			
Dioxin by 1613	Paulos						4.5			
Hex Chrome by SM 3500-Cr D modified										

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Petros Paulos
SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-3-16

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10368583

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Page: 2 of 2

2106888

Section A Required Client Information:

Company: AECOM
Address: 800 LaSalle Ave Suite 500
Minneapolis, MN 55402
Email To: andrew.tarara@AECOM.com
Phone: 612-376-2000 Fax:
Requested Due Date/TAT: Std

Section B Required Project Information:

Report To: Drew Tarara
Copy To: Petros.Paulos@AECOM.com
Purchase Order No.:
Project Name: Mac Gillis & Gibbs Quarterly sampling
Project Number: 60436248

Section C Invoice Information:

Attention: Same
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #: 27489 #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE:

Section D Required Client Information

Matrix Codes MATRIX / CODE

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	PCP by 8270D SIM	Arsenic by 6020A (FF)	Hex Chrome by SM3500-Cr D Modified	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	EW-4					11-3-16	12:02		4	3		1						X	X	X			-013--012
2	EW-7					11-3-16	12:55		3	3								X		X			-014--013
3	MW-103					11-3-16	13:40		2	2								X		X			-015--014
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
1) Arsenic Field Filtered - analysis method 6020A	Petros Paulos / AECOM	11-3	14:03	Pace	11.3.16	1403	5.8 8.9 4.9 1.3	X	N	Y
2) PCP method 8270D SIM										
3) Hex Chrome by SM 3500-Cr D modified										
4) Dioxin by 8613										

ORIGINAL

Page 31 of 32

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Petros Paulos
SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-3-16

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: AECOM

Project #: WO# : 10368583

10368583

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No **Optional:** Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☑ 151401163 ☐ 151401164 ☐ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 8.9, 9.0, 5.0, 4.4 **Cooler Temp Corrected (°C):** 8.8, 8.9, 4.9, 4.3 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** -0.1 **Date and Initials of Person Examining Contents:** 11-3-16 ZH

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☑ Yes	☐ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked? All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☑ Yes ☑ Yes ☐ Yes	☐ No ☐ No ☐ No	☐ N/A ☐ N/A ☑ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample # 1, 6, 9-13 Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution: cooling started

Project Manager Review: Date: 11/3/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

www.pacelabs.com

Report Prepared for:

Andrew Tarara
AECOM
800 LaSalle Avenue, Suite 500
Minneapolis MN 55402

REPORT OF LABORATORY ANALYSIS FOR PCDD/PCDF

Report Information:

Pace Project #: 10368585
Sample Receipt Date: 11/03/2016
Client Project #: 60436248
Client Sub PO #: 30000
State Cert #: 027-053-137

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

This report has been reviewed by:

March 03, 2017

Scott Unze, Project Manager
(612) 607-6383
(612) 607-6444 (fax)
scott.unze@pacelabs.com

Report Prepared Date:
March 3, 2017

Report of Laboratory Analysis

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

DISCUSSION

This report presents the results from the analyses performed on four samples submitted by a representative of AECOM. The samples were analyzed for the presence or absence of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using USEPA Method 1613B. The reporting limits were based on signal-to-noise measurements. Estimated Maximum Possible Concentration (EMPC) values were treated as positives in the toxic equivalence calculations. The samples were received above the recommended temperature range of 0-6 degrees Celsius. "Revision 1" of this report was prepared to provide results for all tetra through octa-chlorinated PCDDs and PCDFs. The current revision was prepared to include B-flags where sample values were similar to EMPC values in the method blank.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extracts ranged from 46-97%. All of the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1613B. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for variation in recovery and accurate values were obtained.

Values were flagged "I" where incorrect isotope ratios were obtained. Concentrations below the calibration range were flagged "J" and should be regarded as estimates.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to contain trace levels of selected congeners. These levels were below the calibration range of the method. Sample levels similar to the corresponding blank levels were flagged "B" on the results tables and may be, at least partially, attributed to the background. It should be noted that levels less than ten times the background are not generally considered to be statistically different from the background.

Laboratory spike samples were also prepared with the sample batch using clean water that had been fortified with native standard materials. The results show that the spiked native compounds were recovered at 87-128% with relative percent differences of 0.0-9.1%. These results were within the target ranges for the method. Matrix spikes were not prepared with the sample batch.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE	MN002
California	01155CA	New York (NEL	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

REPORT OF LABORATORY ANALYSIS

Report No.....10368585

Appendix A

Sample Management

Report No....10368585_1613B Revision 2

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

~~10368583~~ KAE 11-3-16

10368585

Page: 1 of 2

2106889

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www.pacelabs.com

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: AECOM	Report To: Drew Tarara	Attention: Same
Address: 800 La Salle Ave, Suite 500, Minneapolis, MN 55402	Copy To: Petros.Paulos@AECOM.com	Company Name:
Email To: andrew.tarara@AECOM.com	Purchase Order No.:	Address:
Phone: 612-376-2000 Fax:	Project Name: MacGillis & Gibbs Quarterly Sampling	Pace Quote Reference:
Requested Due Date/TAT: Std	Project Number: 60436248	Pace Project Manager: Carol Davy
		Pace Profile #: 27489 #1

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER

Site Location STATE:

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes — MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: PCP by 8270D SIM	Arsenic 6020A	Hex Chrome SM 3500-Cr D mod.	Dioxin by 1613	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW 103					11-2-16	16:56		3	2		1						X	X				001
2	MW 118					11-2-16	18:18		2	2								X						002
3	MW 105					11-2-16	19:01		2	2								X						003
4	MW 104					11-2-16	19:41		2	2								X						004
5	Dup-3					11-2-16			2	2								X						005
6	MW-11B					11-3-16	8:35		6	5		1						X	X	X	X			006
7	MW-11W					11-3-16	8:13		1	1										X				007
8	EW-11					11-3-16	8:45		4	4								X			X			008
9	MW-20					11-3-16	9:39		6	5		1						X	X	X	X			009
10	Dup-2					11-3-16			6	5		1						X	X	X	X			010
11	MW-21W					11-3-16	11:10		4	3		1						X	X	X				011
12	MW-21B					11-3-16	10:40		4	3		1						X	X	X				012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
All Arsenic Samples Field Filtered & method 6020A							
PCP Method 8270D by SIM	Petros / AECOM	11-3-16	14:00	Pace	11-3-16	1403	
Dioxin by 1613	Paulos						
Hex chrome by SM 3500-Cr D modified							

ORIGINAL

SAMPLER NAME AND SIGNATURE			Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:	Petros Paulos					
SIGNATURE of SAMPLER:		DATE Signed (MM/DD/YY): 11-3-16				

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Report No....10368585_1613B Revision 2

Page 6 of 17

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Pace Analytical®
www.pacelabs.com

10368585 Rec 11-3-16
10368585

Page: 2 of 2

2106888

Section A Required Client Information:

Company:	AECOM
Address:	800 LaSalle Ave Suite 500 Minneapolis, MN 55402
Email To:	andrew.tarara@AECOM.com
Phone: 612-376-2008	Fax:
Requested Due Date/TAT:	Std

Section B Required Project Information:

Report To:	Drew Tarara
Copy To:	Petros.Paulos@AECOM.com
Purchase Order No.:	
Project Name:	Mac Gill & Gibbs Quarterly Sampling
Project Number:	60436248

Section C Invoice Information:

Attention:	Same
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Carol Davy
Pace Profile #:	27489 #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE:

Section D Required Client Information

Matrix Codes MATRIX / CODE

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: PCP by 8270D SIM	Arsenic (FD) Analysis by 6020A	Hex Chrome by SM3500-Cr D Modified	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	EW-4					11-3-16	12:02		4	3		1						X	X	X		013
2	EW-7					11-3-16	12:53		3	3								X		X		014
3	MW-103					11-2-16	17:40		2	2								X				015
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
1) Arsenic Field Filtered - analysis method 6020A	Petros Paulos / AECOM	11-3	14:03	Pace	11-3-16	1403	3.8 3.9	X	N	Y
2) PCP method 8270D SIM							4.9 4.3			
3) Hex Chrome by SM 3500-Cr D modified										
4). Dioxin by 8613										

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Petros Paulos

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-3-16

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: AECOM

Project #: WO#:10368585

10368585

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No **Optional:** Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☑ 151401163 ☐ 151401164 ☐ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 8.9, 9.0, 5.0, 4.4 **Cooler Temp Corrected (°C):** 8.8, 8.9, 4.9, 4.3 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** -0.1 **Date and Initials of Person Examining Contents:** 11-3-16 AT

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☑ Yes	☐ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☑ Yes	☐ No	☐ N/A	Sample # 1, 6, 9-13 1r1
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: Scott Unze **Date:** 11/3/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Reporting Flags

A = Reporting Limit based on signal to noise

B = Less than 10x higher than method blank level

C = Result obtained from confirmation analysis

D = Result obtained from analysis of diluted sample

E = Exceeds calibration range

I = Interference present

J = Estimated value

Nn = Value obtained from additional analysis

P = PCDE Interference

R = Recovery outside target range

S = Peak saturated

U = Analyte not detected

V = Result verified by confirmation analysis

X = %D Exceeds limits

Y = Calculated using average of daily RFs

* = See Discussion

Appendix B

Sample Analysis Summary

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Sample Analysis Results

Client - AECOM

Client's Sample ID	MW-11B		
Lab Sample ID	10368585001		
Filename	F161116B_12		
Injected By	SMT		
Total Amount Extracted	943 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	11/03/2016 08:35
ICAL ID	F161011	Received	11/03/2016 14:03
CCal Filename(s)	F161116A_16	Extracted	11/10/2016 12:20
Method Blank ID	BLANK-52744	Analyzed	11/17/2016 09:56

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	1.7		2,3,7,8-TCDF-13C	2.00	68
Total TCDF	26	-----	1.7		2,3,7,8-TCDD-13C	2.00	80
					1,2,3,7,8-PeCDF-13C	2.00	75
2,3,7,8-TCDD	ND	-----	2.0		2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	ND	-----	2.0		1,2,3,7,8-PeCDD-13C	2.00	82
					1,2,3,4,7,8-HxCDF-13C	2.00	86
1,2,3,7,8-PeCDF	ND	-----	1.3		1,2,3,6,7,8-HxCDF-13C	2.00	93
2,3,4,7,8-PeCDF	ND	-----	0.91		2,3,4,6,7,8-HxCDF-13C	2.00	97
Total PeCDF	ND	-----	1.1		1,2,3,7,8,9-HxCDF-13C	2.00	96
					1,2,3,4,7,8-HxCDD-13C	2.00	83
1,2,3,7,8-PeCDD	ND	-----	0.67		1,2,3,6,7,8-HxCDD-13C	2.00	73
Total PeCDD	ND	-----	0.67		1,2,3,4,6,7,8-HpCDF-13C	2.00	75
					1,2,3,4,7,8,9-HpCDF-13C	2.00	77
1,2,3,4,7,8-HxCDF	-----	1.0	0.92	IBJ	1,2,3,4,6,7,8-HpCDD-13C	2.00	88
1,2,3,6,7,8-HxCDF	ND	-----	0.93		OCDD-13C	4.00	79
2,3,4,6,7,8-HxCDF	ND	-----	0.86				
1,2,3,7,8,9-HxCDF	ND	-----	2.0		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	-----	1.2		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	0.97		2,3,7,8-TCDD-37Cl4	0.20	77
1,2,3,6,7,8-HxCDD	-----	1.4	1.2	IBJ			
1,2,3,7,8,9-HxCDD	ND	-----	1.1				
Total HxCDD	1.7	-----	1.1	BJ			
1,2,3,4,6,7,8-HpCDF	7.9	-----	1.4	BJ	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	1.2		Equivalence: 0.65 pg/L		
Total HpCDF	33	-----	1.3	J	(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	-----	25	1.6	IJ			
Total HpCDD	16	-----	1.6	J			
OCDF	-----	28	1.1	IJ			
OCDD	230	-----	1.6				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
EDL = Estimated Detection Limit

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

J = Estimated value
B = Less than 10x higher than method blank level
I = Interference present

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Sample Analysis Results

Client - AECOM

Client's Sample ID	EW-11		
Lab Sample ID	10368585002		
Filename	F161120B_02		
Injected By	BAL		
Total Amount Extracted	959 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	11/03/2016 08:45
ICAL ID	F161011	Received	11/03/2016 14:03
CCal Filename(s)	F161120A_09	Extracted	11/10/2016 12:20
Method Blank ID	BLANK-52744	Analyzed	11/20/2016 12:10

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	1.5		2,3,7,8-TCDF-13C	2.00	56
Total TCDF	ND	-----	1.5		2,3,7,8-TCDD-13C	2.00	64
					1,2,3,7,8-PeCDF-13C	2.00	59
2,3,7,8-TCDD	ND	-----	1.7		2,3,4,7,8-PeCDF-13C	2.00	57
Total TCDD	ND	-----	1.7		1,2,3,7,8-PeCDD-13C	2.00	59
					1,2,3,4,7,8-HxCDF-13C	2.00	73
1,2,3,7,8-PeCDF	ND	-----	0.90		1,2,3,6,7,8-HxCDF-13C	2.00	76
2,3,4,7,8-PeCDF	ND	-----	0.68		2,3,4,6,7,8-HxCDF-13C	2.00	81
Total PeCDF	ND	-----	0.79		1,2,3,7,8,9-HxCDF-13C	2.00	80
					1,2,3,4,7,8-HxCDD-13C	2.00	63
1,2,3,7,8-PeCDD	ND	-----	0.95		1,2,3,6,7,8-HxCDD-13C	2.00	60
Total PeCDD	ND	-----	0.95		1,2,3,4,6,7,8-HpCDF-13C	2.00	58
					1,2,3,4,7,8,9-HpCDF-13C	2.00	59
1,2,3,4,7,8-HxCDF	0.84	-----	0.63	BJ	1,2,3,4,6,7,8-HpCDD-13C	2.00	63
1,2,3,6,7,8-HxCDF	ND	-----	0.68		OCDD-13C	4.00	58
2,3,4,6,7,8-HxCDF	ND	-----	0.56				
1,2,3,7,8,9-HxCDF	ND	-----	1.1		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	0.84	-----	0.73	BJ	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	3.0		2,3,7,8-TCDD-37Cl4	0.20	77
1,2,3,6,7,8-HxCDD	ND	-----	3.4				
1,2,3,7,8,9-HxCDD	ND	-----	2.8				
Total HxCDD	ND	-----	3.1				
1,2,3,4,6,7,8-HpCDF	ND	-----	1.0		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	1.5		Equivalence: 0.086 pg/L		
Total HpCDF	ND	-----	1.3		(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	ND	-----	1.4				
Total HpCDD	ND	-----	1.4				
OCDF	ND	-----	2.9				
OCDD	-----	7.2	2.8	IBJ			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
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NC = Not Calculated

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REPORT OF LABORATORY ANALYSIS

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1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Sample Analysis Results

Client - AECOM

Client's Sample ID	MW-20		
Lab Sample ID	10368585003		
Filename	F161120B_03		
Injected By	BAL		
Total Amount Extracted	947 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	11/03/2016 09:39
ICAL ID	F161011	Received	11/03/2016 14:03
CCal Filename(s)	F161120A_09	Extracted	11/10/2016 12:20
Method Blank ID	BLANK-52744	Analyzed	11/20/2016 12:58

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	1.7		2,3,7,8-TCDF-13C	2.00	52
Total TCDF	ND	-----	1.7		2,3,7,8-TCDD-13C	2.00	61
					1,2,3,7,8-PeCDF-13C	2.00	67
2,3,7,8-TCDD	ND	-----	1.8		2,3,4,7,8-PeCDF-13C	2.00	70
Total TCDD	ND	-----	1.8		1,2,3,7,8-PeCDD-13C	2.00	72
					1,2,3,4,7,8-HxCDF-13C	2.00	86
1,2,3,7,8-PeCDF	ND	-----	1.2		1,2,3,6,7,8-HxCDF-13C	2.00	91
2,3,4,7,8-PeCDF	ND	-----	0.81		2,3,4,6,7,8-HxCDF-13C	2.00	97
Total PeCDF	ND	-----	0.99		1,2,3,7,8,9-HxCDF-13C	2.00	92
					1,2,3,4,7,8-HxCDD-13C	2.00	73
1,2,3,7,8-PeCDD	ND	-----	0.90		1,2,3,6,7,8-HxCDD-13C	2.00	77
Total PeCDD	ND	-----	0.90		1,2,3,4,6,7,8-HpCDF-13C	2.00	71
					1,2,3,4,7,8,9-HpCDF-13C	2.00	68
1,2,3,4,7,8-HxCDF	ND	-----	0.71		1,2,3,4,6,7,8-HpCDD-13C	2.00	77
1,2,3,6,7,8-HxCDF	ND	-----	0.59		OCDD-13C	4.00	61
2,3,4,6,7,8-HxCDF	ND	-----	0.62				
1,2,3,7,8,9-HxCDF	ND	-----	0.69		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	-----	0.65		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	2.0		2,3,7,8-TCDD-37Cl4	0.20	59
1,2,3,6,7,8-HxCDD	ND	-----	1.9				
1,2,3,7,8,9-HxCDD	ND	-----	2.0				
Total HxCDD	ND	-----	1.9				
1,2,3,4,6,7,8-HpCDF	2.2	-----	1.1	BJ	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	1.4		Equivalence: 0.070 pg/L		
Total HpCDF	7.3	-----	1.3	BJ	(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	3.5	-----	1.3	BJ			
Total HpCDD	6.6	-----	1.3	BJ			
OCDF	12	-----	2.4	J			
OCDD	31	-----	3.8	J			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
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NC = Not Calculated

J = Estimated value
B = Less than 10x higher than method blank level

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Sample Analysis Results

Client - AECOM

Client's Sample ID	Dup-2		
Lab Sample ID	10368585004		
Filename	F161116B_13		
Injected By	SMT		
Total Amount Extracted	982 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	11/03/2016 00:01
ICAL ID	F161011	Received	11/03/2016 14:03
CCal Filename(s)	F161116A_16	Extracted	11/10/2016 12:20
Method Blank ID	BLANK-52744	Analyzed	11/17/2016 10:45

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	1.9		2,3,7,8-TCDF-13C	2.00	46
Total TCDF	ND	-----	1.9		2,3,7,8-TCDD-13C	2.00	52
					1,2,3,7,8-PeCDF-13C	2.00	60
2,3,7,8-TCDD	ND	-----	1.6		2,3,4,7,8-PeCDF-13C	2.00	66
Total TCDD	ND	-----	1.6		1,2,3,7,8-PeCDD-13C	2.00	68
					1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	ND	-----	0.56		1,2,3,6,7,8-HxCDF-13C	2.00	79
2,3,4,7,8-PeCDF	ND	-----	0.44		2,3,4,6,7,8-HxCDF-13C	2.00	86
Total PeCDF	ND	-----	0.50		1,2,3,7,8,9-HxCDF-13C	2.00	85
					1,2,3,4,7,8-HxCDD-13C	2.00	71
1,2,3,7,8-PeCDD	ND	-----	0.84		1,2,3,6,7,8-HxCDD-13C	2.00	65
Total PeCDD	ND	-----	0.84		1,2,3,4,6,7,8-HpCDF-13C	2.00	66
					1,2,3,4,7,8,9-HpCDF-13C	2.00	70
1,2,3,4,7,8-HxCDF	ND	-----	0.64		1,2,3,4,6,7,8-HpCDD-13C	2.00	79
1,2,3,6,7,8-HxCDF	ND	-----	0.72		OCDD-13C	4.00	68
2,3,4,6,7,8-HxCDF	ND	-----	0.62				
1,2,3,7,8,9-HxCDF	ND	-----	0.92		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	1.4	-----	0.72	BJ	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	0.97		2,3,7,8-TCDD-37Cl4	0.20	54
1,2,3,6,7,8-HxCDD	ND	-----	0.96				
1,2,3,7,8,9-HxCDD	ND	-----	1.0				
Total HxCDD	ND	-----	0.98				
1,2,3,4,6,7,8-HpCDF	-----	1.9	0.82	IBJ	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	1.6		Equivalence: 0.090 pg/L		
Total HpCDF	7.1	-----	1.2	BJ	(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	4.9	-----	1.3	BJ			
Total HpCDD	4.9	-----	1.3	BJ			
OCDF	13	-----	2.3	J			
OCDD	56	-----	4.2	J			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
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J = Estimated value
B = Less than 10x higher than method blank level
I = Interference present

REPORT OF LABORATORY ANALYSIS

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1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Blank Analysis Results

Lab Sample ID	BLANK-52744	Matrix	Water
Filename	U161112A_10	Dilution	NA
Total Amount Extracted	1030 mL	Extracted	11/10/2016 12:20
ICAL ID	U161025	Analyzed	11/12/2016 17:23
CCal Filename(s)	U161111B_16	Injected By	BAL

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	-----	1.6	0.91	IJ	2,3,7,8-TCDF-13C	2.00	59
Total TCDF	ND	-----	0.91		2,3,7,8-TCDD-13C	2.00	67
					1,2,3,7,8-PeCDF-13C	2.00	59
2,3,7,8-TCDD	1.8	-----	0.94	J	2,3,4,7,8-PeCDF-13C	2.00	65
Total TCDD	1.8	-----	0.94	J	1,2,3,7,8-PeCDD-13C	2.00	70
					1,2,3,4,7,8-HxCDF-13C	2.00	73
1,2,3,7,8-PeCDF	-----	4.7	1.8	IJ	1,2,3,6,7,8-HxCDF-13C	2.00	71
2,3,4,7,8-PeCDF	3.5	-----	0.67	J	2,3,4,6,7,8-HxCDF-13C	2.00	82
Total PeCDF	3.5	-----	1.2	J	1,2,3,7,8,9-HxCDF-13C	2.00	86
					1,2,3,4,7,8-HxCDD-13C	2.00	80
1,2,3,7,8-PeCDD	4.0	-----	1.0	J	1,2,3,6,7,8-HxCDD-13C	2.00	70
Total PeCDD	4.0	-----	1.0	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	82
					1,2,3,4,7,8,9-HpCDF-13C	2.00	89
1,2,3,4,7,8-HxCDF	2.5	-----	0.93	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	93
1,2,3,6,7,8-HxCDF	-----	1.9	1.1	IJ	OCDD-13C	4.00	71
2,3,4,6,7,8-HxCDF	1.5	-----	0.65	J			
1,2,3,7,8,9-HxCDF	1.5	-----	0.75	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	5.4	-----	0.86	J	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	-----	1.5	0.84	IJ	2,3,7,8-TCDD-37Cl4	0.20	67
1,2,3,6,7,8-HxCDD	-----	1.6	0.86	IJ			
1,2,3,7,8,9-HxCDD	1.5	-----	0.76	J			
Total HxCDD	1.5	-----	0.82	J			
1,2,3,4,6,7,8-HpCDF	-----	0.96	0.34	IJ	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	0.95	-----	0.41	J	Equivalence: 8.4 pg/L		
Total HpCDF	0.95	-----	0.37	J	(Lower-bound - Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	-----	1.00	0.60	IJ			
Total HpCDD	ND	-----	0.60				
OCDF	-----	0.83	0.68	IJ			
OCDD	-----	2.4	1.4	IJ			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
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I = Interference present

REPORT OF LABORATORY ANALYSIS

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1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-52745		
Filename	U161112A_02	Matrix	Water
Total Amount Extracted	1020 mL	Dilution	NA
ICAL ID	U161025	Extracted	11/10/2016 12:20
CCal Filename	U161111B_16	Analyzed	11/12/2016 11:50
Method Blank ID	BLANK-52744	Injected By	BAL

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	10	7.5	15.8	102
2,3,7,8-TCDD	10	8.7	6.7	15.8	87
1,2,3,7,8-PeCDF	50	53	40.0	67.0	106
2,3,4,7,8-PeCDF	50	55	34.0	80.0	110
1,2,3,7,8-PeCDD	50	51	35.0	71.0	102
1,2,3,4,7,8-HxCDF	50	54	36.0	67.0	109
1,2,3,6,7,8-HxCDF	50	53	42.0	65.0	105
2,3,4,6,7,8-HxCDF	50	53	35.0	78.0	106
1,2,3,7,8,9-HxCDF	50	52	39.0	65.0	103
1,2,3,4,7,8-HxCDD	50	58	35.0	82.0	115
1,2,3,6,7,8-HxCDD	50	59	38.0	67.0	117
1,2,3,7,8,9-HxCDD	50	61	32.0	81.0	122
1,2,3,4,6,7,8-HpCDF	50	55	41.0	61.0	111
1,2,3,4,7,8,9-HpCDF	50	51	39.0	69.0	102
1,2,3,4,6,7,8-HpCDD	50	50	35.0	70.0	100
OCDF	100	100	63.0	170.0	103
OCDD	100	110	78.0	144.0	114
2,3,7,8-TCDD-37Cl4	10	5.0	3.1	19.1	50
2,3,7,8-TCDF-13C	100	41	22.0	152.0	41
2,3,7,8-TCDD-13C	100	49	20.0	175.0	49
1,2,3,7,8-PeCDF-13C	100	49	21.0	192.0	49
2,3,4,7,8-PeCDF-13C	100	57	13.0	328.0	57
1,2,3,7,8-PeCDD-13C	100	63	21.0	227.0	63
1,2,3,4,7,8-HxCDF-13C	100	68	19.0	202.0	68
1,2,3,6,7,8-HxCDF-13C	100	64	21.0	159.0	64
2,3,4,6,7,8-HxCDF-13C	100	76	22.0	176.0	76
1,2,3,7,8,9-HxCDF-13C	100	79	17.0	205.0	79
1,2,3,4,7,8-HxCDD-13C	100	76	21.0	193.0	76
1,2,3,6,7,8-HxCDD-13C	100	66	25.0	163.0	66
1,2,3,4,6,7,8-HpCDF-13C	100	78	21.0	158.0	78
1,2,3,4,7,8,9-HpCDF-13C	100	82	20.0	186.0	82
1,2,3,4,6,7,8-HpCDD-13C	100	91	26.0	166.0	91
OCDD-13C	200	130	26.0	397.0	66

Cs = Concentration Spiked (ng/mL)
Cr = Concentration Recovered (ng/mL)
Rec. = Recovery (Expressed as Percent)
Control Limit Reference: Method 1613, Table 6, 10/94 Revision
R = Recovery outside of control limits
Nn = Value obtained from additional analysis
* = See Discussion

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCSD-52746		
Filename	U161112A_03	Matrix	Water
Total Amount Extracted	1040 mL	Dilution	NA
ICAL ID	U161025	Extracted	11/10/2016 12:20
CCal Filename	U161111B_16	Analyzed	11/12/2016 12:36
Method Blank ID	BLANK-52744	Injected By	BAL

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	10	7.5	15.8	104
2,3,7,8-TCDD	10	8.8	6.7	15.8	88
1,2,3,7,8-PeCDF	50	50	40.0	67.0	101
2,3,4,7,8-PeCDF	50	53	34.0	80.0	106
1,2,3,7,8-PeCDD	50	50	35.0	71.0	101
1,2,3,4,7,8-HxCDF	50	53	36.0	67.0	106
1,2,3,6,7,8-HxCDF	50	52	42.0	65.0	104
2,3,4,6,7,8-HxCDF	50	51	35.0	78.0	103
1,2,3,7,8,9-HxCDF	50	52	39.0	65.0	105
1,2,3,4,7,8-HxCDD	50	52	35.0	82.0	105
1,2,3,6,7,8-HxCDD	50	64	38.0	67.0	128
1,2,3,7,8,9-HxCDD	50	58	32.0	81.0	116
1,2,3,4,6,7,8-HpCDF	50	56	41.0	61.0	112
1,2,3,4,7,8,9-HpCDF	50	51	39.0	69.0	102
1,2,3,4,6,7,8-HpCDD	50	50	35.0	70.0	100
OCDF	100	110	63.0	170.0	106
OCDD	100	110	78.0	144.0	112
2,3,7,8-TCDD-37Cl4	10	8.3	3.1	19.1	83
2,3,7,8-TCDF-13C	100	70	22.0	152.0	70
2,3,7,8-TCDD-13C	100	79	20.0	175.0	79
1,2,3,7,8-PeCDF-13C	100	63	21.0	192.0	63
2,3,4,7,8-PeCDF-13C	100	67	13.0	328.0	67
1,2,3,7,8-PeCDD-13C	100	75	21.0	227.0	75
1,2,3,4,7,8-HxCDF-13C	100	81	19.0	202.0	81
1,2,3,6,7,8-HxCDF-13C	100	79	21.0	159.0	79
2,3,4,6,7,8-HxCDF-13C	100	88	22.0	176.0	88
1,2,3,7,8,9-HxCDF-13C	100	90	17.0	205.0	90
1,2,3,4,7,8-HxCDD-13C	100	89	21.0	193.0	89
1,2,3,6,7,8-HxCDD-13C	100	73	25.0	163.0	73
1,2,3,4,6,7,8-HpCDF-13C	100	87	21.0	158.0	87
1,2,3,4,7,8,9-HpCDF-13C	100	90	20.0	186.0	90
1,2,3,4,6,7,8-HpCDD-13C	100	100	26.0	166.0	103
OCDD-13C	200	140	26.0	397.0	71

Cs = Concentration Spiked (ng/mL)
Cr = Concentration Recovered (ng/mL)
Rec. = Recovery (Expressed as Percent)
Control Limit Reference: Method 1613, Table 6, 10/94 Revision
R = Recovery outside of control limits
Nn = Value obtained from additional analysis
* = See Discussion

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B

Spike Recovery Relative Percent Difference (RPD) Results

Client	AECOM		
Spike 1 ID	LCS-52745	Spike 2 ID	LCSD-52746
Spike 1 Filename	U161112A_02	Spike 2 Filename	U161112A_03

Compound	Spike 1 %REC	Spike 2 %REC	%RPD
2,3,7,8-TCDF	102	104	1.9
2,3,7,8-TCDD	87	88	1.1
1,2,3,7,8-PeCDF	106	101	4.8
2,3,4,7,8-PeCDF	110	106	3.7
1,2,3,7,8-PeCDD	102	101	1.0
1,2,3,4,7,8-HxCDF	109	106	2.8
1,2,3,6,7,8-HxCDF	105	104	1.0
2,3,4,6,7,8-HxCDF	106	103	2.9
1,2,3,7,8,9-HxCDF	103	105	1.9
1,2,3,4,7,8-HxCDD	115	105	9.1
1,2,3,6,7,8-HxCDD	117	128	9.0
1,2,3,7,8,9-HxCDD	122	116	5.0
1,2,3,4,6,7,8-HpCDF	111	112	0.9
1,2,3,4,7,8,9-HpCDF	102	102	0.0
1,2,3,4,6,7,8-HpCDD	100	100	0.0
OCDF	103	106	2.9
OCDD	114	112	1.8

%REC = Percent Recovered
RPD = The difference between the two values divided by the mean value

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

November 16, 2016

Andrew Tarara
AECOM
800 LaSalle Avenue, Suite 500
Minneapolis, MN 55402

RE: Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Dear Andrew Tarara:
Enclosed are the analytical results for sample(s) received by the laboratory on November 03, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

cc: Petros Paulos, AECOM

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
Alaska Certification UST-107
525 N 8th Street, Salina, KS 67401
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10368663001	**EW-18**	Water	11/03/16 13:58	11/03/16 18:50
10368663002	**EW-15**	Water	11/03/16 15:26	11/03/16 18:50
10368663003	**EW-16**	Water	11/03/16 16:40	11/03/16 18:50
10368663004	**EW-12**	Water	11/03/16 17:52	11/03/16 18:50
10368663005	**FB-1**	Water	11/03/16 17:49	11/03/16 18:50

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Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10368663001	**EW-18**	EPA 6020A	TT3	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368663002	**EW-15**	EPA 6020A	TT3	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368663003	**EW-16**	EPA 6020A	TT3	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368663004	**EW-12**	EPA 6020A	TT3	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M
10368663005	**FB-1**	EPA 6020A	TT3	1	PASI-M
		Pace SOP	TT3	1	PASI-M
		EPA 8270D by SIM	JLR	2	PASI-M

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Minneapolis, MN 55414
(612)607-1700

SUMMARY OF DETECTION

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
10368663001	**EW-18**					
EPA 6020A	Arsenic, Dissolved	0.82	ug/L	0.50	11/15/16 10:05	
Pace SOP	Chromium, Hexavalent	1.3	ug/L	0.050	11/04/16 10:59	N2
10368663002	**EW-15**					
EPA 6020A	Arsenic, Dissolved	0.89	ug/L	0.50	11/15/16 10:07	
Pace SOP	Chromium, Hexavalent	0.080	ug/L	0.050	11/04/16 11:04	N2
10368663003	**EW-16**					
EPA 6020A	Arsenic, Dissolved	0.87	ug/L	0.50	11/15/16 10:20	
Pace SOP	Chromium, Hexavalent	0.25	ug/L	0.050	11/04/16 11:08	N2
10368663004	**EW-12**					
EPA 6020A	Arsenic, Dissolved	0.28J	ug/L	0.50	11/15/16 10:27	
Pace SOP	Chromium, Hexavalent	0.36	ug/L	0.050	11/04/16 11:13	N2
EPA 8270D by SIM	Pentachlorophenol	2.7	ug/L	0.64	11/13/16 00:14	
10368663005	**FB-1**					
Pace SOP	Chromium, Hexavalent	0.15	ug/L	0.050	11/04/16 11:17	N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Method: **EPA 6020A**
Description: 6020A MET ICPMS, Dissolved
Client: AECOM MN ND
Date: November 16, 2016

General Information:
5 samples were analyzed for EPA 6020A. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3020 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Method: **Pace SOP**
Description: LC-ICPMS Speciated Chromium
Client: AECOM MN ND
Date: November 16, 2016

General Information:
5 samples were analyzed for Pace SOP. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 445188

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- BLANK (Lab ID: 2431322)
  - Chromium, Hexavalent
- EW-12 (Lab ID: 10368663004)
  - Chromium, Hexavalent
- EW-15 (Lab ID: 10368663002)
  - Chromium, Hexavalent
- EW-16 (Lab ID: 10368663003)
  - Chromium, Hexavalent
- EW-18 (Lab ID: 10368663001)
  - Chromium, Hexavalent
- FB-1 (Lab ID: 10368663005)
  - Chromium, Hexavalent
- LCS (Lab ID: 2431323)
  - Chromium, Hexavalent

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Method: **Pace SOP**
Description: LC-ICPMS Speciated Chromium
Client: AECOM MN ND
Date: November 16, 2016

Analyte Comments:

QC Batch: 445188

N2: The lab does not hold NELAC/TNI accreditation for this parameter.

- MS (Lab ID: 2431325)
  - Chromium, Hexavalent
- MSD (Lab ID: 2431326)
  - Chromium, Hexavalent

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Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Method: **EPA 8270D by SIM**
Description: 8270D MSSV PCP by SIM
Client: AECOM MN ND
Date: November 16, 2016

General Information:
5 samples were analyzed for EPA 8270D by SIM. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3510C with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Sample: EW-18 **Lab ID: 10368663001** Collected: 11/03/16 13:58 Received: 11/03/16 18:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.82**	ug/L	0.50	0.091	1	11/14/16 14:25	11/15/16 10:05	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**1.3**	ug/L	0.050	0.014	1		11/04/16 10:59		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.64	0.30	1	11/08/16 08:15	11/14/16 14:20	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	84	%.	46-125		1	11/08/16 08:15	11/14/16 14:20	118-79-6	

REPORT OF LABORATORY ANALYSIS

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Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Sample: EW-15 **Lab ID: 10368663002** Collected: 11/03/16 15:26 Received: 11/03/16 18:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.89**	ug/L	0.50	0.091	1	11/14/16 14:25	11/15/16 10:07	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**0.080**	ug/L	0.050	0.014	1		11/04/16 11:04		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.31**	ug/L	0.66	0.31	1	11/08/16 08:15	11/14/16 14:41	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	85	%.	46-125		1	11/08/16 08:15	11/14/16 14:41	118-79-6	

REPORT OF LABORATORY ANALYSIS

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Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Sample: EW-16 **Lab ID: 10368663003** Collected: 11/03/16 16:40 Received: 11/03/16 18:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.87**	ug/L	0.50	0.091	1	11/14/16 14:25	11/15/16 10:20	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**0.25**	ug/L	0.050	0.014	1		11/04/16 11:08		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	11/08/16 08:15	11/12/16 23:54	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	72	%.	46-125		1	11/08/16 08:15	11/12/16 23:54	118-79-6	

REPORT OF LABORATORY ANALYSIS

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(612)607-1700

ANALYTICAL RESULTS

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Sample: EW-12 **Lab ID: 10368663004** Collected: 11/03/16 17:52 Received: 11/03/16 18:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**0.28J**	ug/L	0.50	0.091	1	11/14/16 14:25	11/15/16 10:27	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**0.36**	ug/L	0.050	0.014	1		11/04/16 11:13		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**2.7**	ug/L	0.64	0.30	1	11/08/16 08:15	11/13/16 00:14	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	93	%.	46-125		1	11/08/16 08:15	11/13/16 00:14	118-79-6	

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ANALYTICAL RESULTS

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Sample: FB-1 **Lab ID: 10368663005** Collected: 11/03/16 17:49 Received: 11/03/16 18:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020								
Arsenic, Dissolved	**<0.091**	ug/L	0.50	0.091	1	11/14/16 14:25	11/15/16 10:30	7440-38-2	
LC-ICPMS Speciated Chromium	Analytical Method: Pace SOP								
Chromium, Hexavalent	**0.15**	ug/L	0.050	0.014	1		11/04/16 11:17		N2
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.63	0.29	1	11/08/16 08:15	11/13/16 00:34	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	92	%.	46-125		1	11/08/16 08:15	11/13/16 00:34	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

QC Batch: 445188 Analysis Method: Pace SOP
QC Batch Method: Pace SOP Analysis Description: LC-ICPMS Speciation
Associated Lab Samples: 10368663001, 10368663002, 10368663003, 10368663004, 10368663005

METHOD BLANK: 2431322 Matrix: Water
Associated Lab Samples: 10368663001, 10368663002, 10368663003, 10368663004, 10368663005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chromium, Hexavalent	ug/L	<0.014	0.050	0.014	11/04/16 10:50	N2

LABORATORY CONTROL SAMPLE: 2431323

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	ug/L	.5	0.49	99	80-120	N2

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2431325 2431326

Parameter	Units	10368663002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Hexavalent	ug/L	0.080	.5	.5	0.53	0.57	90	98	75-125	8	20	N2

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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(612)607-1700

QUALITY CONTROL DATA

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

QC Batch: 445353 Analysis Method: EPA 6020A
QC Batch Method: EPA 3020 Analysis Description: 6020A Water Dissolved UPD4
Associated Lab Samples: 10368663001, 10368663002, 10368663003, 10368663004, 10368663005

METHOD BLANK: 2432923 Matrix: Water
Associated Lab Samples: 10368663001, 10368663002, 10368663003, 10368663004, 10368663005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic, Dissolved	ug/L	<0.091	0.50	0.091	11/15/16 09:28	

LABORATORY CONTROL SAMPLE: 2432924

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	ug/L	100	103	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2432925 2432926

Parameter	Units	10368637001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	ug/L	ND	100	100	105	105	104	105	75-125	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2432927 2432928

Parameter	Units	10368663002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	ug/L	0.89	100	100	104	106	103	105	75-125	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

QC Batch: 445789 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3510C Analysis Description: 8270D PCP MSSV
Associated Lab Samples: 10368663001, 10368663002, 10368663003, 10368663004, 10368663005

METHOD BLANK: 2435935 Matrix: Water
Associated Lab Samples: 10368663001, 10368663002, 10368663003, 10368663004, 10368663005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Pentachlorophenol	ug/L	<0.28	0.60	0.28	11/12/16 17:09	
2,4,6-Tribromophenol (S)	%.	89	46-125		11/12/16 17:09	

LABORATORY CONTROL SAMPLE: 2435936

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Pentachlorophenol	ug/L	1	0.66	66	30-125	
2,4,6-Tribromophenol (S)	%.			88	46-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2435937 2435938

Parameter	Units	10368663002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Pentachlorophenol	ug/L	<0.31	1.1	1.1	0.57J	0.52J	41	38	30-125		30	
2,4,6-Tribromophenol (S)	%.						83	85	46-125			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

N2	The lab does not hold NELAC/TNI accreditation for this parameter.

Pace Analytical Services, LLC
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60436248 Mac Gillis & Gibbs Qu
Pace Project No.: 10368663

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10368663001	**EW-18**	EPA 3020	445353	EPA 6020A	447074
10368663002	**EW-15**	EPA 3020	445353	EPA 6020A	447074
10368663003	**EW-16**	EPA 3020	445353	EPA 6020A	447074
10368663004	**EW-12**	EPA 3020	445353	EPA 6020A	447074
10368663005	**FB-1**	EPA 3020	445353	EPA 6020A	447074
10368663001	**EW-18**	Pace SOP	445188		
10368663002	**EW-15**	Pace SOP	445188		
10368663003	**EW-16**	Pace SOP	445188		
10368663004	**EW-12**	Pace SOP	445188		
10368663005	**FB-1**	Pace SOP	445188		
10368663001	**EW-18**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368663002	**EW-15**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368663003	**EW-16**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368663004	**EW-12**	EPA 3510C	445789	EPA 8270D by SIM	446746
10368663005	**FB-1**	EPA 3510C	445789	EPA 8270D by SIM	446746

Pace Analytical®
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10368663

Page: 1 of 1

2146525

Section A Required Client Information:

Company: AECOM
Address: 800 LaSalle Ave Suite 500
Minneapolis MN 55402
Email To: andrew.tarara@AECOM.com
Phone: 612 376-2000 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Drew Tarara
Copy To: petros.paulos@AECOM.com
Purchase Order No.:
Project Name: MacGillis & Gibbs Quarterly Sampling
Project Number: 60436248

Section C Invoice Information:

Attention: Sage
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #: 27489 #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE:

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes MATRIX / CODE

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	PCB 8270D SIM	FF Arsenic 6020A	Chrome SM 3500-CrD Modified	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	EW-18					11-3-16	13:59		4	3		1						X	X	X			001
2	EW-15						15:26		4	3		1						X	X	X			002
3	EW-15 MS-2						15:26		4	3		1						X	X	X			003
4	EW-15 MSD-2						15:26		4	3		1						X	X	X			004
5	EW-16						1640		4	3		1						X	X	X			005
6	EW-12						17:52		4	3		1						X	X	X			006
7	FB-1						17:49		4	3		1						X	X	X			007
8																								
9																								
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
1) FF Arsenic 6020A - Field Filtered										
2) PCB 8270D SIM	Petros Paulos/AECOM	11-3-16	18:50		11-3-16	18:50	1.3	Y	N	Y
3). Chrome SM 3500 vCrD Modified							0.7			

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Petros Paulos

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-3-16

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: AECOM

Project #: WO#: 10368663

10368663

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☐ 151401163 ☐ 151401164 ☐ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 13.0.7 **Cooler Temp Corrected (°C):** 12.0.8 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** -0.1 **Date and Initials of Person Examining Contents:** BC 11-03-16

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☑ Yes	☐ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☐ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked? All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☑ Yes ☑ Yes	☐ No ☐ No	☐ N/A ☐ N/A	13. ☑ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl Sample # 1-12
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: Carol Doug **Date:** 11/4/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

November 15, 2016

Andrew Tarara
AECOM
800 LaSalle Avenue, Suite 500
Minneapolis, MN 55402

RE: Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Dear Andrew Tarara:
Enclosed are the analytical results for sample(s) received by the laboratory on November 04, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

cc: Petros Paulos, AECOM

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
Alaska Certification UST-107
525 N 8th Street, Salina, KS 67401
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10368798001	**FB-2**	Water	11/04/16 07:36	11/04/16 16:07
10368798002	**MW-107**	Water	11/04/16 08:42	11/04/16 16:07
10368798003	**MW-108**	Water	11/04/16 09:22	11/04/16 16:07
10368798004	**MW-106**	Water	11/04/16 10:00	11/04/16 16:07
10368798005	**MW-24w**	Water	11/04/16 10:45	11/04/16 16:07
10368798006	**EW-9**	Water	11/04/16 11:30	11/04/16 16:07
10368798007	**MW-17B**	Water	11/04/16 11:49	11/04/16 16:07
10368798008	**Dup-1**	Water	11/04/16 00:00	11/04/16 16:07
10368798009	**Mw-23B**	Water	11/04/16 13:59	11/04/16 16:07
10368798010	**MW-124**	Water	11/04/16 13:05	11/04/16 16:07

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SAMPLE ANALYTE COUNT

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10368798001	**FB-2**	EPA 8270D by SIM	JLR	2	PASI-M
10368798002	**MW-107**	EPA 8270D by SIM	JLR	2	PASI-M
10368798003	**MW-108**	EPA 8270D by SIM	JLR	2	PASI-M
10368798004	**MW-106**	EPA 8270D by SIM	JLR	2	PASI-M
10368798005	**MW-24w**	EPA 8270D by SIM	JLR	2	PASI-M
10368798006	**EW-9**	EPA 8270D by SIM	JLR	2	PASI-M
10368798007	**MW-17B**	EPA 8270D by SIM	JLR	2	PASI-M
10368798008	**Dup-1**	EPA 8270D by SIM	JLR	2	PASI-M
10368798009	**Mw-23B**	EPA 8270D by SIM	JLR	2	PASI-M
10368798010	**MW-124**	EPA 8270D by SIM	JLR	2	PASI-M

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SUMMARY OF DETECTION

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
10368798002	**MW-107**					
EPA 8270D by SIM	Pentachlorophenol	0.60J	ug/L	0.62	11/14/16 20:04	
10368798005	**MW-24w**					
EPA 8270D by SIM	Pentachlorophenol	23.1	ug/L	3.3	11/15/16 12:40	
10368798006	**EW-9**					
EPA 8270D by SIM	Pentachlorophenol	20500	ug/L	3490	11/15/16 14:01	
10368798007	**MW-17B**					
EPA 8270D by SIM	Pentachlorophenol	769	ug/L	64.5	11/15/16 13:00	
10368798008	**Dup-1**					
EPA 8270D by SIM	Pentachlorophenol	727	ug/L	62.5	11/15/16 13:20	
10368798009	**Mw-23B**					
EPA 8270D by SIM	Pentachlorophenol	23.1	ug/L	3.1	11/15/16 13:40	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Method: **EPA 8270D by SIM**
Description: 8270D MSSV PCP by SIM
Client: AECOM MN ND
Date: November 15, 2016

General Information:
10 samples were analyzed for EPA 8270D by SIM. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3510C with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

QC Batch: 446109

S4: Surrogate recovery not evaluated against control limits due to sample dilution.

- Dup-1 (Lab ID: 10368798008)
  - 2,4,6-Tribromophenol (S)
- EW-9 (Lab ID: 10368798006)
  - 2,4,6-Tribromophenol (S)
- MW-17B (Lab ID: 10368798007)
  - 2,4,6-Tribromophenol (S)

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 446109

A matrix spike/matrix spike duplicate was not performed due to insufficient sample volume.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Method: **EPA 8270D by SIM**
Description: 8270D MSSV PCP by SIM
Client: AECOM MN ND
Date: November 15, 2016

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Sample: FB-2 **Lab ID: 10368798001** Collected: 11/04/16 07:36 Received: 11/04/16 16:07 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.62	0.29	1	11/09/16 12:53	11/14/16 19:43	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	84	%.	46-125		1	11/09/16 12:53	11/14/16 19:43	118-79-6	

REPORT OF LABORATORY ANALYSIS

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1700 Elm Street - Suite 200
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(612)607-1700

ANALYTICAL RESULTS

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Sample: MW-107 **Lab ID: 10368798002** Collected: 11/04/16 08:42 Received: 11/04/16 16:07 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**0.60J**	ug/L	0.62	0.29	1	11/09/16 12:53	11/14/16 20:04	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	95	%.	46-125		1	11/09/16 12:53	11/14/16 20:04	118-79-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Sample: MW-108 **Lab ID: 10368798003** Collected: 11/04/16 09:22 Received: 11/04/16 16:07 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.31**	ug/L	0.67	0.31	1	11/09/16 12:53	11/14/16 20:24	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	87	%.	46-125		1	11/09/16 12:53	11/14/16 20:24	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Sample: MW-106 **Lab ID: 10368798004** Collected: 11/04/16 10:00 Received: 11/04/16 16:07 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.29**	ug/L	0.63	0.29	1	11/09/16 12:53	11/14/16 20:44	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	86	%.	46-125		1	11/09/16 12:53	11/14/16 20:44	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Sample: MW-24w **Lab ID: 10368798005** Collected: 11/04/16 10:45 Received: 11/04/16 16:07 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**23.1**	ug/L	3.3	1.6	5	11/09/16 12:53	11/15/16 12:40	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	105	%.	46-125		5	11/09/16 12:53	11/15/16 12:40	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Sample: EW-9 **Lab ID: 10368798006** Collected: 11/04/16 11:30 Received: 11/04/16 16:07 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**20500**	ug/L	3490	1650	5000	11/09/16 12:53	11/15/16 14:01	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	0	%.	46-125		5000	11/09/16 12:53	11/15/16 14:01	118-79-6	S4

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Sample: MW-17B **Lab ID: 10368798007** Collected: 11/04/16 11:49 Received: 11/04/16 16:07 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**769**	ug/L	64.5	30.4	100	11/09/16 12:53	11/15/16 13:00	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	0	%.	46-125		100	11/09/16 12:53	11/15/16 13:00	118-79-6	S4

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Sample: Dup-1 **Lab ID: 10368798008** Collected: 11/04/16 00:00 Received: 11/04/16 16:07 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**727**	ug/L	62.5	29.5	100	11/09/16 12:53	11/15/16 13:20	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	0	%.	46-125		100	11/09/16 12:53	11/15/16 13:20	118-79-6	S4

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Sample: Mw-23B **Lab ID: 10368798009** Collected: 11/04/16 13:59 Received: 11/04/16 16:07 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**23.1**	ug/L	3.1	1.5	5	11/09/16 12:53	11/15/16 13:40	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	84	%.	46-125		5	11/09/16 12:53	11/15/16 13:40	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Sample: MW-124 **Lab ID: 10368798010** Collected: 11/04/16 13:05 Received: 11/04/16 16:07 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PCP by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pentachlorophenol	**<0.30**	ug/L	0.64	0.30	1	11/09/16 12:53	11/15/16 12:19	87-86-5	
Surrogates									
2,4,6-Tribromophenol (S)	83	%.	46-125		1	11/09/16 12:53	11/15/16 12:19	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

QC Batch: 446109 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3510C Analysis Description: 8270D PCP MSSV
Associated Lab Samples: 10368798001, 10368798002, 10368798003, 10368798004, 10368798005, 10368798006, 10368798007, 10368798008, 10368798009, 10368798010

METHOD BLANK: 2438069 Matrix: Water
Associated Lab Samples: 10368798001, 10368798002, 10368798003, 10368798004, 10368798005, 10368798006, 10368798007, 10368798008, 10368798009, 10368798010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Pentachlorophenol	ug/L	<0.28	0.60	0.28	11/14/16 18:43	
2,4,6-Tribromophenol (S)	%.	89	46-125		11/14/16 18:43	

LABORATORY CONTROL SAMPLE & LCSD: 2438070 2438071

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Pentachlorophenol	ug/L	1	0.71	0.75	71	75	30-125	6	20	
2,4,6-Tribromophenol (S)	%.				85	96	46-125			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

BATCH QUALIFIERS

Batch: 447002

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

ANALYTE QUALIFIERS

S4 Surrogate recovery not evaluated against control limits due to sample dilution.

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60436298 M&G Quarterly Samp.Q3
Pace Project No.: 10368798

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10368798001	**FB-2**	EPA 3510C	446109	EPA 8270D by SIM	447002
10368798002	**MW-107**	EPA 3510C	446109	EPA 8270D by SIM	447002
10368798003	**MW-108**	EPA 3510C	446109	EPA 8270D by SIM	447002
10368798004	**MW-106**	EPA 3510C	446109	EPA 8270D by SIM	447002
10368798005	**MW-24w**	EPA 3510C	446109	EPA 8270D by SIM	447002
10368798006	**EW-9**	EPA 3510C	446109	EPA 8270D by SIM	447002
10368798007	**MW-17B**	EPA 3510C	446109	EPA 8270D by SIM	447002
10368798008	**Dup-1**	EPA 3510C	446109	EPA 8270D by SIM	447002
10368798009	**Mw-23B**	EPA 3510C	446109	EPA 8270D by SIM	447002
10368798010	**MW-124**	EPA 3510C	446109	EPA 8270D by SIM	447002

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

60366248

Page: 1 of 1

2106890

Section A Required Client Information:

Company:	AECOM
Address:	800 LaSalle Ave Suite 500
	Minneapolis MN 55402
Email To:	andrew.farara@AECOM.com
Phone: 612-376-2000	Fax:
Requested Due Date/TAT:	std

Section B Required Project Information:

Report To:	Drew Farara
Copy To:	Petros.paulos@AECOM.com
Purchase Order No.:	
Project Name:	M&G Quarterly Sampling Q3
Project Number:	60436248

Section C Invoice Information:

Attention:	Same
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Carol Davy
Pace Profile #:	17489 #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: _____

Section D Required Client Information

Matrix Codes (MATRIX / CODE)

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: PCP 8270D SIM	Nitrogen	Dioxin 1613	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	FB-2					11-4-16	7:36		2	2								X				01
2	MW-107					11-4-16	8:42		2	2								X				02
3	MW-108					11-4-16	9:22		2	2								X				03
4	MW-106					11-4-16	10:00		2	2								X				04
5	MW-24W					11-4-16	10:45		2	2								X				05
6	EW-9					11-4-16	11:30		2	2								X				06
7	MW-17B					11-4-16	11:49		4	4								X		X		07
8	Dup-1					11-4-16			2	2								X				08
9	MW-23B					11-4-16	13:59		2	2								X				09
10	MW-124					11-4-16	13:05		2	2								X				10
11																						
12																						

Requested Analysis Filtered (Y/N)

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
1) PCP by 8270D SIM		11-4-16	1606		11-04-16	1607	6.5	X	N	Y
2) Dioxin by 1613							5.3			

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Petros Paulos

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-4-16

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: ARCOM

Project #: WO#: 10368798

10368798

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:_____

Tracking Number: _____

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other:_____ **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☑ 151401163 ☐ B88A912167504 ☐ 151401164 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☑ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 5.4 0.6 **Cooler Temp Corrected (°C):** 5.3 0.5 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** -0.1 **Date and Initials of Person Examining Contents:** AE 11/4/16

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☑ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☑ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: _____ **Date:** 11/7/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

Report Prepared for:

Andrew Tarara
AECOM
800 LaSalle Avenue, Suite 500
Minneapolis MN 55402

REPORT OF LABORATORY ANALYSIS FOR PCDD/PCDF

Report Information:

Pace Project #: 10368800
Sample Receipt Date: 11/04/2016
Client Project #: 60436298
Client Sub PO #: 30000
State Cert #: 027-053-137

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

This report has been reviewed by:

November 21, 2016

Scott Unze, Project Manager
(612) 607-6383
(612) 607-6444 (fax)
scott.unze@pacelabs.com

Report Prepared Date:
November 21, 2016

Report of Laboratory Analysis

Pace Analytical Services, Inc.
1700 Elm Street
Minneapolis, MN 55414
Phone: 612.607.1700
Fax: 612.607.6444

DISCUSSION

This report presents the results from the analysis performed on one sample submitted by a representative of AECOM. The sample was analyzed for the presence or absence of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using USEPA Method 1613B. The reporting limits were based on signal-to-noise measurements. Estimated Maximum Possible Concentration (EMPC) values were treated as positives in the toxic equivalence calculations.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extract ranged from 80-110%. All of the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1613B. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for variation in recovery and accurate values were obtained.

Values were flagged "I" where incorrect isotope ratios were obtained. Concentrations below the calibration range were flagged "J" and should be regarded as estimates.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to contain trace levels of selected congeners. These levels were below the calibration range of the method. The levels reported for the affected congeners in the field sample were higher than the corresponding blank levels by one or more orders of magnitude. These results indicate that the sample processing steps did not contribute significantly to the levels reported for the field sample.

Laboratory spike samples were also prepared with the sample batch using clean reference matrix that had been fortified with native standard materials. The results show that the spiked native compounds were recovered at 90-128% with relative percent differences of 0.0-10.6%. These results were within the target ranges for the method. Matrix spikes were not prepared with the sample batch.

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	NE-OS-18-06
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE	MN002
California	01155CA	New York (NEL	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia #	9952C
Maryland	322	West Virginia D	382
Michigan	9909	Wisconsin	999407970
Minnesota	027-053-137	Wyoming	8TMS-Q

REPORT OF LABORATORY ANALYSIS

Report No.....10368800

Appendix A

Sample Management

Pace Analytical®
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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10368800

Page: 1 of 1

2106890

Report No.: 10368800_4613B

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: AECOM	Report To: Drew Farara	Attention: Same
Address: 300 LaSalle Ave Suite 500 Minneapolis MN 55402	Copy To: Petras.paulos@AECOM.com	Company Name:
Email To: andrew.farara@AECOM.com	Purchase Order No.:	Address:
Phone: 612-376-2000 Fax:	Project Name: M&G Quarterly Sampling Q3	Pace Quote Reference:
Requested Due Date/TAT: STD	Project Number: 60436248	Pace Project Manager: Carol Davy
		Pace Profile #: 27489 #1

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE:

Requested Analysis Filtered (Y/N)

Section D Required Client Information

Matrix Codes — MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: PCP 8270D SIM	Dioxin 1613	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	FB-2					11-4-16	7:36		2	2								X			
2	MW-107					11-4-16	8:42		2	2								X			
3	MW-108					11-4-16	9:22		2	2								X			
4	MW-106					11-4-16	10:00		2	2								X			
5	MW-24W					11-4-16	10:45		2	2								X			
6	EW-9					11-4-16	11:30		2	2								X			
7	MW-17B					11-4-16	11:49		4	4								X	X		001
8	Dup-1					11-4-16			2	2								X			
9	MW-23B					11-4-16	13:59		2	2								X			
10	MW-124					11-4-16	13:05		2	2								X			
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PCP by 8270D SIM	[signature]	11-4-16	1606	[signature] / FEDEX	11-04-16	1607	6.5	X	N	Y
Dioxin by 1613							5.3			

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Petras Paulos

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-4-16

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 02Aug2016 Page 1 of 2
	Document No.: **F-MN-L-213-rev.17**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: ARCOM

Project #: WO#:10368800

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No **Seals Intact?** ☐ Yes ☑ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☑ Yes ☐ No

Thermometer Used: ☑ 151401163 ☐ 151401164 ☐ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☑ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 5.4-0.6 **Cooler Temp Corrected (°C):** 5.2-0.5 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** -0.1 **Date and Initials of Person Examining Contents:** AE 11/4/16

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☑ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☑ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☑ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: WT				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: Scott Unze **Date:** 11/7/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Reporting Flags

A = Reporting Limit based on signal to noise

B = Less than 10x higher than method blank level

C = Result obtained from confirmation analysis

D = Result obtained from analysis of diluted sample

E = Exceeds calibration range

I = Interference present

J = Estimated value

Nn = Value obtained from additional analysis

P = PCDE Interference

R = Recovery outside target range

S = Peak saturated

U = Analyte not detected

V = Result verified by confirmation analysis

X = %D Exceeds limits

Y = Calculated using average of daily RFs

* = See Discussion

Appendix B

Sample Analysis Summary

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Sample Analysis Results

Client - AECOM

Client's Sample ID	MW-17B		
Lab Sample ID	10368800001		
Filename	U161121B_09		
Injected By	SMT		
Total Amount Extracted	952 mL	Matrix	Water
% Moisture	NA	Dilution	NA
Dry Weight Extracted	NA	Collected	11/04/2016 11:49
ICAL ID	U161025	Received	11/04/2016 16:07
CCal Filename(s)	U161121B_02	Extracted	11/11/2016 11:00
Method Blank ID	BLANK-52757	Analyzed	11/21/2016 15:37

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	0.53		2,3,7,8-TCDF-13C	2.00	90
Total TCDF	0.69	-----	0.53	J	2,3,7,8-TCDD-13C	2.00	104
					1,2,3,7,8-PeCDF-13C	2.00	99
2,3,7,8-TCDD	ND	-----	0.46		2,3,4,7,8-PeCDF-13C	2.00	96
Total TCDD	ND	-----	0.46		1,2,3,7,8-PeCDD-13C	2.00	110
					1,2,3,4,7,8-HxCDF-13C	2.00	89
1,2,3,7,8-PeCDF	ND	-----	0.64		1,2,3,6,7,8-HxCDF-13C	2.00	86
2,3,4,7,8-PeCDF	ND	-----	0.32		2,3,4,6,7,8-HxCDF-13C	2.00	92
Total PeCDF	ND	-----	0.48		1,2,3,7,8,9-HxCDF-13C	2.00	93
					1,2,3,4,7,8-HxCDD-13C	2.00	92
1,2,3,7,8-PeCDD	ND	-----	0.51		1,2,3,6,7,8-HxCDD-13C	2.00	80
Total PeCDD	ND	-----	0.51		1,2,3,4,6,7,8-HpCDF-13C	2.00	87
					1,2,3,4,7,8,9-HpCDF-13C	2.00	102
1,2,3,4,7,8-HxCDF	ND	-----	0.52		1,2,3,4,6,7,8-HpCDD-13C	2.00	110
1,2,3,6,7,8-HxCDF	-----	0.46	0.44	IJ	OCDD-13C	4.00	100
2,3,4,6,7,8-HxCDF	-----	0.41	0.39	IJ			
1,2,3,7,8,9-HxCDF	ND	-----	0.42		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	-----	0.44		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	0.50		2,3,7,8-TCDD-37Cl4	0.20	107
1,2,3,6,7,8-HxCDD	ND	-----	0.47				
1,2,3,7,8,9-HxCDD	ND	-----	0.48				
Total HxCDD	0.64	-----	0.48	J			
1,2,3,4,6,7,8-HpCDF	10.00	-----	0.65	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	0.98		Equivalence: 0.34 pg/L		
Total HpCDF	25.00	-----	0.82	J	(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	12.00	-----	0.91	J			
Total HpCDD	22.00	-----	0.91	J			
OCDF	30.00	-----	0.88	J			
OCDD	81.00	-----	1.00	J			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
EDL = Estimated Detection Limit

ND = Not Detected
NA = Not Applicable
NC = Not Calculated

J = Estimated value
I = Interference present

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Blank Analysis Results

Lab Sample ID	BLANK-52757	Matrix	Water
Filename	U161116B_07	Dilution	NA
Total Amount Extracted	1030 mL	Extracted	11/11/2016 11:00
ICAL ID	U161025	Analyzed	11/16/2016 12:54
CCal Filename(s)	U161116B_01	Injected By	SMT

Native Isomers	Conc pg/L	EMPC pg/L	EDL pg/L		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	-----	1.60		2,3,7,8-TCDF-13C	2.00	76
Total TCDF	ND	-----	1.60		2,3,7,8-TCDD-13C	2.00	83
					1,2,3,7,8-PeCDF-13C	2.00	64
2,3,7,8-TCDD	ND	-----	1.30		2,3,4,7,8-PeCDF-13C	2.00	73
Total TCDD	ND	-----	1.30		1,2,3,7,8-PeCDD-13C	2.00	79
					1,2,3,4,7,8-HxCDF-13C	2.00	72
1,2,3,7,8-PeCDF	-----	1.50	1.20	IJ	1,2,3,6,7,8-HxCDF-13C	2.00	69
2,3,4,7,8-PeCDF	-----	0.66	0.56	IJ	2,3,4,6,7,8-HxCDF-13C	2.00	80
Total PeCDF	ND	-----	0.90		1,2,3,7,8,9-HxCDF-13C	2.00	82
					1,2,3,4,7,8-HxCDD-13C	2.00	81
1,2,3,7,8-PeCDD	ND	-----	1.10		1,2,3,6,7,8-HxCDD-13C	2.00	65
Total PeCDD	ND	-----	1.10		1,2,3,4,6,7,8-HpCDF-13C	2.00	78
					1,2,3,4,7,8,9-HpCDF-13C	2.00	79
1,2,3,4,7,8-HxCDF	ND	-----	0.70		1,2,3,4,6,7,8-HpCDD-13C	2.00	86
1,2,3,6,7,8-HxCDF	ND	-----	0.74		OCDD-13C	4.00	59
2,3,4,6,7,8-HxCDF	ND	-----	0.73				
1,2,3,7,8,9-HxCDF	ND	-----	0.85		1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	-----	0.76		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	-----	0.72		2,3,7,8-TCDD-37Cl4	0.20	83
1,2,3,6,7,8-HxCDD	ND	-----	0.89				
1,2,3,7,8,9-HxCDD	ND	-----	0.75				
Total HxCDD	ND	-----	0.79				
1,2,3,4,6,7,8-HpCDF	0.62	-----	0.61	J	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	-----	0.91		Equivalence: 0.27 pg/L		
Total HpCDF	2.40	-----	0.76	J	(Using 2005 WHO Factors)		
1,2,3,4,6,7,8-HpCDD	-----	1.60	1.20	IJ			
Total HpCDD	1.70	-----	1.20	J			
OCDF	ND	-----	1.50				
OCDD	-----	8.20	2.70	IJ			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
EDL = Estimated Detection Limit

J = Estimated value
I = Interference present

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-52758		
Filename	U161116B_14	Matrix	Water
Total Amount Extracted	982 mL	Dilution	NA
ICAL ID	U161025	Extracted	11/11/2016 11:00
CCal Filename	U161116B_01	Analyzed	11/16/2016 18:18
Method Blank ID	BLANK-52757	Injected By	SMT

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	11	7.5	15.8	109
2,3,7,8-TCDD	10	9.0	6.7	15.8	90
1,2,3,7,8-PeCDF	50	52	40.0	67.0	105
2,3,4,7,8-PeCDF	50	54	34.0	80.0	107
1,2,3,7,8-PeCDD	50	51	35.0	71.0	102
1,2,3,4,7,8-HxCDF	50	54	36.0	67.0	108
1,2,3,6,7,8-HxCDF	50	55	42.0	65.0	109
2,3,4,6,7,8-HxCDF	50	49	35.0	78.0	98
1,2,3,7,8,9-HxCDF	50	52	39.0	65.0	103
1,2,3,4,7,8-HxCDD	50	58	35.0	82.0	115
1,2,3,6,7,8-HxCDD	50	58	38.0	67.0	116
1,2,3,7,8,9-HxCDD	50	62	32.0	81.0	124
1,2,3,4,6,7,8-HpCDF	50	55	41.0	61.0	110
1,2,3,4,7,8,9-HpCDF	50	49	39.0	69.0	98
1,2,3,4,6,7,8-HpCDD	50	52	35.0	70.0	104
OCDF	100	110	63.0	170.0	106
OCDD	100	110	78.0	144.0	111
2,3,7,8-TCDD-37Cl4	10	8.9	3.1	19.1	89
2,3,7,8-TCDF-13C	100	75	22.0	152.0	75
2,3,7,8-TCDD-13C	100	85	20.0	175.0	85
1,2,3,7,8-PeCDF-13C	100	64	21.0	192.0	64
2,3,4,7,8-PeCDF-13C	100	68	13.0	328.0	68
1,2,3,7,8-PeCDD-13C	100	73	21.0	227.0	73
1,2,3,4,7,8-HxCDF-13C	100	71	19.0	202.0	71
1,2,3,6,7,8-HxCDF-13C	100	68	21.0	159.0	68
2,3,4,6,7,8-HxCDF-13C	100	82	22.0	176.0	82
1,2,3,7,8,9-HxCDF-13C	100	85	17.0	205.0	85
1,2,3,4,7,8-HxCDD-13C	100	77	21.0	193.0	77
1,2,3,6,7,8-HxCDD-13C	100	66	25.0	163.0	66
1,2,3,4,6,7,8-HpCDF-13C	100	81	21.0	158.0	81
1,2,3,4,7,8,9-HpCDF-13C	100	85	20.0	186.0	85
1,2,3,4,6,7,8-HpCDD-13C	100	89	26.0	166.0	89
OCDD-13C	200	130	26.0	397.0	67

Cs = Concentration Spiked (ng/mL)
Cr = Concentration Recovered (ng/mL)
Rec. = Recovery (Expressed as Percent)
Control Limit Reference: Method 1613, Table 6, 10/94 Revision
R = Recovery outside of control limits
Nn = Value obtained from additional analysis
* = See Discussion

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCSD-52759		
Filename	U161117A_04	Matrix	Water
Total Amount Extracted	955 mL	Dilution	NA
ICAL ID	U161025	Extracted	11/11/2016 11:00
CCal Filename	U161117A_01	Analyzed	11/17/2016 09:13
Method Blank ID	BLANK-52757	Injected By	SMT

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	11	7.5	15.8	107
2,3,7,8-TCDD	10	9.0	6.7	15.8	90
1,2,3,7,8-PeCDF	50	56	40.0	67.0	111
2,3,4,7,8-PeCDF	50	58	34.0	80.0	115
1,2,3,7,8-PeCDD	50	53	35.0	71.0	106
1,2,3,4,7,8-HxCDF	50	56	36.0	67.0	112
1,2,3,6,7,8-HxCDF	50	54	42.0	65.0	108
2,3,4,6,7,8-HxCDF	50	53	35.0	78.0	105
1,2,3,7,8,9-HxCDF	50	54	39.0	65.0	108
1,2,3,4,7,8-HxCDD	50	53	35.0	82.0	106
1,2,3,6,7,8-HxCDD	50	64	38.0	67.0	128
1,2,3,7,8,9-HxCDD	50	61	32.0	81.0	122
1,2,3,4,6,7,8-HpCDF	50	56	41.0	61.0	111
1,2,3,4,7,8,9-HpCDF	50	54	39.0	69.0	109
1,2,3,4,6,7,8-HpCDD	50	52	35.0	70.0	103
OCDF	100	120	63.0	170.0	117
OCDD	100	110	78.0	144.0	113
2,3,7,8-TCDD-37Cl4	10	8.2	3.1	19.1	82
2,3,7,8-TCDF-13C	100	70	22.0	152.0	70
2,3,7,8-TCDD-13C	100	81	20.0	175.0	81
1,2,3,7,8-PeCDF-13C	100	65	21.0	192.0	65
2,3,4,7,8-PeCDF-13C	100	61	13.0	328.0	61
1,2,3,7,8-PeCDD-13C	100	68	21.0	227.0	68
1,2,3,4,7,8-HxCDF-13C	100	74	19.0	202.0	74
1,2,3,6,7,8-HxCDF-13C	100	75	21.0	159.0	75
2,3,4,6,7,8-HxCDF-13C	100	78	22.0	176.0	78
1,2,3,7,8,9-HxCDF-13C	100	76	17.0	205.0	76
1,2,3,4,7,8-HxCDD-13C	100	78	21.0	193.0	78
1,2,3,6,7,8-HxCDD-13C	100	64	25.0	163.0	64
1,2,3,4,6,7,8-HpCDF-13C	100	69	21.0	158.0	69
1,2,3,4,7,8,9-HpCDF-13C	100	69	20.0	186.0	69
1,2,3,4,6,7,8-HpCDD-13C	100	76	26.0	166.0	76
OCDD-13C	200	120	26.0	397.0	62

Cs = Concentration Spiked (ng/mL)
Cr = Concentration Recovered (ng/mL)
Rec. = Recovery (Expressed as Percent)
Control Limit Reference: Method 1613, Table 6, 10/94 Revision
R = Recovery outside of control limits
Nn = Value obtained from additional analysis
* = See Discussion

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612- 607-6444

Method 1613B

Spike Recovery Relative Percent Difference (RPD) Results

Client AECOM

Spike 1 ID LCS-52758 Spike 2 ID LCSD-52759
Spike 1 Filename U161116B_14 Spike 2 Filename U161117A_04

Compound	Spike 1 %REC	Spike 2 %REC	%RPD
2,3,7,8-TCDF	109	107	1.9
2,3,7,8-TCDD	90	90	0.0
1,2,3,7,8-PeCDF	105	111	5.6
2,3,4,7,8-PeCDF	107	115	7.2
1,2,3,7,8-PeCDD	102	106	3.8
1,2,3,4,7,8-HxCDF	108	112	3.6
1,2,3,6,7,8-HxCDF	109	108	0.9
2,3,4,6,7,8-HxCDF	98	105	6.9
1,2,3,7,8,9-HxCDF	103	108	4.7
1,2,3,4,7,8-HxCDD	115	106	8.1
1,2,3,6,7,8-HxCDD	116	128	9.8
1,2,3,7,8,9-HxCDD	124	122	1.6
1,2,3,4,6,7,8-HpCDF	110	111	0.9
1,2,3,4,7,8,9-HpCDF	98	109	10.6
1,2,3,4,6,7,8-HpCDD	104	103	1.0
OCDF	106	117	9.9
OCDD	111	113	1.8

%REC = Percent Recovered
RPD = The difference between the two values divided by the mean value

REPORT OF LABORATORY ANALYSIS

Appendix 2

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Laboratory Data Review Checklist

Doc Type: Data Review

Instructions: The following is the Minnesota Pollution Control Agency's (MPCA) informal checklist that may be used to review data. The information follows the general format of the National Functional Guidelines which is the primary data review tool used in the U.S. Environmental Protection Agency's Contract Laboratory Program for Superfund analytical work. This checklist should be used in conjunction with the *Laboratory Data Checklist Guidance* (p-eao-11a): http://www.pca.state.mn.us/index.php/view-document.html?gid=16113. Also see the MPCA Laboratory Quality Control (QC) and Data Policy: http://www.pca.state.mn.us/index.php/view-document.html?gid=16288.

Project Information

Project name: MacGillis and Gibbs Quarterly Sampling Laboratory: Pace

Work order number: 10368467 Report date (mm/dd/yyyy): 11/14/2016

1. Preservation

For help with this section on holding times, containers and preservatives, refer to the Minnesota Department of Health's website at: http://www.health.state.mn.us/divs/phl/environmental/handbook/internet/envhandbook.html.

Questions			Yes	No	N/A	Comments
a.	Is there a chain of custody (COC) with the report?		☒	☐	☐	Dioxin results submitted in separate SDG
b.	Is there a sample condition form with the report?		☒	☐	☐	
c.	Were there samples requiring preservation?		☒	☐	☐	
	i.	If so, were they properly preserved?	☒	☐	☐	
	ii.	Were they received on ice?	☒	☐	☐	Cooler >6 degrees C. Samples collected same day and hand delivered, cooling started. Okay.
d.	Were samples received in the correct containers?		☒	☐	☐	
	i.	Was there enough sample volume/weight to complete all requested analyses?	☒	☐	☐	
	ii.	Was there enough extra sample collected to complete method required batch QC?	☒	☐	☐	
e.	Were samples received with adequate holding time for sample prep for all requested analyses?		☒	☐	☐	
f.	Are there notes about sample condition or holding time issues on the COC? Explain impact.		☐	☒	☐	
g.	Is there narration or data qualifiers within the report about sample condition or holding time issues? Explain impact.		☐	☒	☐	

2. Calibration

Question		Yes	No	N/A	Comments
a.	Do the report narrative or data qualifiers indicate calibration problems for any analyses? If yes, explain the data impact.	☐	☒	☐	

3. Blanks

Question			Yes	No	N/A	Comments
a.	Do any of the analyses contain samples for field or trip blanks?		☐	☒	☐	SDG 10368663 Hexavlanet chromium: 0.15 ug/L in FB-1. Others ND.
	i.	If yes, are there target analytes present above the reporting limit?	☒	☐	☐	
	ii.	If yes, are the same compounds also present in the samples? Explain possible impact.	☒	☐	☐	Potential for false positives. Samples with concentrations <10x blank qualified "B".
b.	Do method blanks for any analyses contain target analytes above the reporting limit?		☐	☒	☐	
	i.	If yes, are the same compounds present in the samples?	☐	☐	☒	
	ii.	Is the amount of target analyte in the blank more than 1/10th of that in the sample(s)? Explain the possible impact on sample results.	☐	☐	☒	

4. Surrogates

Question			Yes	No	N/A	Comments
a.	Are there organic analyses that contain surrogate compounds?		☒	☐	☐	
b.	Are the lab recovery limits specified on the report?		☒	☐	☐	
	i.	Do the lab limits seem reasonable when compared with the suggested guidelines in the MPCA QC Policy?	☒	☐	☐	
c.	Are there surrogates outside lab limits? (These should have a data qualifier)		☒	☐	☐	Diluted out, Okay.
	i.	If yes, are the surrogates above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Explain what this could mean for the affected samples.	☐	☐	☒	

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Question			Yes	No	N/A	Comments
a.	Are there LCS/LCSD samples present for the reported analyses? (An LCS alone is acceptable if there is an Matrix Spike/Matrix Spike Duplicate [MS/MSD] or sample/sample dup for precision.)		☒	☐	☐	LCS
	i.	If so, do the lab limits seem reasonable compared to the suggested guidelines in the MPCA QC Policy?	☐	☒	☐	PCP 30-125% vs MPCA limits of 50-150%
b.	Are there LCS/LCSD compounds outside lab limits? (These should have a data qualifier.)		☐	☒	☐	
	i.	If yes, are the analytes above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Are all samples in the preparation batch also flagged for the same analyte(s)?	☐	☐	☒	

	iv.	Explain what this could mean for the affected samples.	☐	☐	☒	

6. Matrix Spike/Matrix Spike Duplicate/Sample Duplicate (MS/MSD/Dup)

Question			Yes	No	N/A	Comments
a.	Do the analytical methods used require an MS and/or MSD? If no, skip to 6.b.		☒	☐	☐	
	i.	Have the required matrix spikes been prepared and reported?	☒	☐	☐	
	ii.	If no, is there and explanation in the report as to why?	☐	☐	☒	
	iii.	Did the lab process an alternate spiked sample (such as LCSD) instead?	☐	☐	☒	
	iv.	Are the lab limits specified on the report?	☒	☐	☐	
	v.	Do the limits seem reasonable when compared to the suggested guidelines in the MPCA QC Policy?	☐	☒	☐	PCP limits 30-125 vs 50 - 150%
	vi.	Are there compounds outside the lab limits?	☒	☐	☐	
		1. If yes, are the analytes above the lab limits?	☐	☒	☐	
		2. Below the lab limits?	☒	☐	☐	
		3. Is the source sample also flagged for compounds outside lab limits?	☒	☐	☐	Sample concentration >4x spike concentration, okay.
b.	Is a sample duplicate reported for the analytical method(s)? If no, skip to 6.c.		☒	☐	☐	Four field duplicates were collected over the sampling event
	i.	Is the RPD for the duplicate pair within the lab limits?	☒	☐	☐	
	ii.	If no, has the associated source sample been flagged?	☐	☐	☒	
c.	What is the impact of failed QC on this project?		☐	☐	☒	

7. Method Detection Limits/Report Limits

Question		Yes	No	N/A	Comments
a.	Are reporting and/or method detection limits clearly listed on the report for all analyses? (may also be called quantitation limits)	☒	☐	☐	Results reported to the MDL

Additional comments on report:

Hexavalent chromium results were qualied due to equipment blank contamination of 0.15 ug/L:

EW-5: 0.079 changed to <0.079 J, MDL and RL changed to 0.079.

Dup 4: 0.017 J changed to <0.050 J, MDL changed to 0.050.

MW-19B 0.61 J

Results <PQL were J qualified by the laboratory. No other data qualifiers were assigned.

Pace is not NELAC accredited for the hexavalent chromium analysis. They are certified through MDH.

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Laboratory Data Review Checklist

Doc Type: Data Review

Instructions: The following is the Minnesota Pollution Control Agency's (MPCA) informal checklist that may be used to review data. The information follows the general format of the National Functional Guidelines which is the primary data review tool used in the U.S. Environmental Protection Agency's Contract Laboratory Program for Superfund analytical work. This checklist should be used in conjunction with the *Laboratory Data Checklist Guidance* (p-eao-11a): http://www.pca.state.mn.us/index.php/view-document.html?gid=16113. Also see the MPCA Laboratory Quality Control (QC) and Data Policy: http://www.pca.state.mn.us/index.php/view-document.html?gid=16288.

Project Information

Project name: MacGillis and Gibbs Quarterly Sampling Laboratory: Pace

Work order number: 10368583 Report date (mm/dd/yyyy): 11/15/2016

1. Preservation

For help with this section on holding times, containers and preservatives, refer to the Minnesota Department of Health's website at: http://www.health.state.mn.us/divs/phl/environmental/handbook/internet/envhandbook.html.

Questions			Yes	No	N/A	Comments
a.	Is there a chain of custody (COC) with the report?		☒	☐	☐	Dioxin results submitted in separate SDG
b.	Is there a sample condition form with the report?		☒	☐	☐	
c.	Were there samples requiring preservation?		☒	☐	☐	
	i.	If so, were they properly preserved?	☒	☐	☐	
	ii.	Were they received on ice?	☒	☐	☐	Two coolers warm (8.8 and 8.9 degrees C). Those collected same day and hand delivered, okay, cooling started. Those collected on the prior day qualified as estimated (J) for organic parameters.
d.	Were samples received in the correct containers?		☒	☐	☐	
	i.	Was there enough sample volume/weight to complete all requested analyses?	☒	☐	☐	
	ii.	Was there enough extra sample collected to complete method required batch QC?	☒	☐	☐	
e.	Were samples received with adequate holding time for sample prep for all requested analyses?		☒	☐	☐	24 hour hold time for hexavalent chromium met. All others met as well.
f.	Are there notes about sample condition or holding time issues on the COC? Explain impact.		☐	☒	☐	
g.	Is there narration or data qualifiers within the report about sample condition or holding time issues? Explain impact.		☐	☒	☐	

2. Calibration

Question		Yes	No	N/A	Comments
a.	Do the report narrative or data qualifiers indicate	☐	☒	☐	

	calibration problems for any analyses? If yes, explain the data impact.				

3. Blanks

Question			Yes	No	N/A	Comments
a.	Do any of the analyses contain samples for field or trip blanks?		☐	☒	☐	SDG 10368663 Chromium, Hexavalent 0.15 ug/L in FB-1. Others ND.
	i.	If yes, are there target analytes present above the reporting limit?	☒	☐	☐	
	ii.	If yes, are the same compounds also present in the samples? Explain possible impact.	☒	☐	☐	No affect, results either not detected or >10x blank concentration.
b.	Do method blanks for any analyses contain target analytes above the reporting limit?		☐	☒	☐	
	i.	If yes, are the same compounds present in the samples?	☐	☐	☒	
	ii.	Is the amount of target analyte in the blank more than 1/10th of that in the sample(s)? Explain the possible impact on sample results.	☐	☐	☒	

4. Surrogates

Question			Yes	No	N/A	Comments
a.	Are there organic analyses that contain surrogate compounds?		☒	☐	☐	
b.	Are the lab recovery limits specified on the report?		☒	☐	☐	Surrogate for PCP analysis, 46 - 125%R, okay
	i.	Do the lab limits seem reasonable when compared with the suggested guidelines in the MPCA QC Policy?	☒	☐	☐	
c.	Are there surrogates outside lab limits? (These should have a data qualifier)		☒	☐	☐	Diluted out, Okay.
	i.	If yes, are the surrogates above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Explain what this could mean for the affected samples.	☐	☐	☒	

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Question			Yes	No	N/A	Comments
a.	Are there LCS/LCSD samples present for the reported analyses? (An LCS alone is acceptable if there is an Matrix Spike/Matrix Spike Duplicate [MS/MSD] or sample/sample dup for precision.)		☒	☐	☐	LCS
	i.	If so, do the lab limits seem reasonable compared to the suggested guidelines in the MPCA QC Policy?	☐	☒	☐	PCP 30-125% vs MPCA limits of 50-150%
b.	Are there LCS/LCSD compounds outside lab limits? (These should have a data qualifier.)		☐	☒	☐	
	i.	If yes, are the analytes above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Are all samples in the preparation batch also	☐	☐	☒	

		flagged for the same analyte(s)?				
	iv.	Explain what this could mean for the affected samples.	☐	☐	☒	

6. Matrix Spike/Matrix Spike Duplicate/Sample Duplicate (MS/MSD/Dup)

Question				Yes	No	N/A	Comments
a.	Do the analytical methods used require an MS and/or MSD? If no, skip to 6.b.			☒	☐	☐	
	i.	Have the required matrix spikes been prepared and reported?		☒	☐	☐	
	ii.	If no, is there and explanation in the report as to why?		☐	☐	☒	
	iii.	Did the lab process an alternate spiked sample (such as LCSD) instead?		☐	☐	☒	
	iv.	Are the lab limits specified on the report?		☒	☐	☐	
	v.	Do the limits seem reasonable when compared to the suggested guidelines in the MPCA QC Policy?		☐	☒	☐	PCP: 30-125 vs 50 - 150%
	vi.	Are there compounds outside the lab limits?		☒	☐	☐	
		1.	If yes, are the analytes above the lab limits?	☐	☒	☐	
		2.	Below the lab limits?	☒	☐	☐	
		3.	Is the source sample also flagged for compounds outside lab limits?	☒	☐	☐	Sample concentration >4x spike concentration, okay.
b.	Is a sample duplicate reported for the analytical method(s)? If no, skip to 6.c.			☒	☐	☐	Four field duplicates were collected over the sampling event, RPDs <20% for all results
	i.	Is the RPD for the duplicate pair within the lab limits?		☒	☐	☐	
	ii.	If no, has the associated source sample been flagged?		☐	☐	☒	
c.	What is the impact of failed QC on this project?			☐	☐	☒	

7. Method Detection Limits/Report Limits

Question		Yes	No	N/A	Comments
a.	Are reporting and/or method detection limits clearly listed on the report for all analyses? (may also be called quantitation limits)	☒	☐	☐	Results reported to the MDL

Additional comments on report:

Six pentachlorophenol results were J qualied due to a warm cooler temperature: MW-123, MW-118, MW-105, MW-104, Dup3 (MW-105 FD), and MW-103. Results <PQL were J qualified by the laboratory. No other data qualifiers were assigned.

Pace is not NELAC accredited for the hexavalent chromium analysis. They are certified through MDH.

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Laboratory Data Review Checklist

Doc Type: Data Review

Instructions: The following is the Minnesota Pollution Control Agency's (MPCA) informal checklist that may be used to review data. The information follows the general format of the National Functional Guidelines which is the primary data review tool used in the U.S. Environmental Protection Agency's Contract Laboratory Program for Superfund analytical work. This checklist should be used in conjunction with the *Laboratory Data Checklist Guidance* (p-eao-11a): http://www.pca.state.mn.us/index.php/view-document.html?gid=16113. Also see the MPCA Laboratory Quality Control (QC) and Data Policy: http://www.pca.state.mn.us/index.php/view-document.html?gid=16288.

Project Information

Project name: MacGillis and Gibbs Quarterly Sampling
Laboratory: Pace
Work order number: 10368663
Report date (mm/dd/yyyy): 11/16/2016

1. Preservation

For help with this section on holding times, containers and preservatives, refer to the Minnesota Department of Health's website at: http://www.health.state.mn.us/divs/phl/environmental/handbook/internet/envhandbook.html.

Questions			Yes	No	N/A	Comments
a.	Is there a chain of custody (COC) with the report?		☒	☐	☐	
b.	Is there a sample condition form with the report?		☒	☐	☐	
c.	Were there samples requiring preservation?		☒	☐	☐	
	i.	If so, were they properly preserved?	☒	☐	☐	
	ii.	Were they received on ice?	☒	☐	☐	
d.	Were samples received in the correct containers?		☒	☐	☐	
	i.	Was there enough sample volume/weight to complete all requested analyses?	☒	☐	☐	
	ii.	Was there enough extra sample collected to complete method required batch QC?	☒	☐	☐	
e.	Were samples received with adequate holding time for sample prep for all requested analyses?		☒	☐	☐	24 hour hold time for hexavalent chromium met. All others met as well.
f.	Are there notes about sample condition or holding time issues on the COC? Explain impact.		☐	☒	☐	
g.	Is there narration or data qualifiers within the report about sample condition or holding time issues? Explain impact.		☐	☒	☐	

2. Calibration

Question		Yes	No	N/A	Comments
a.	Do the report narrative or data qualifiers indicate calibration problems for any analyses? If yes, explain the data impact.	☐	☒	☐	

3. Blanks

Question			Yes	No	N/A	Comments
a.	Do any of the analyses contain samples for field or trip blanks?		☐	☒	☐	Chromium, Hexavalent 0.15 ug/L in FB-1. Others ND.
	i.	If yes, are there target analytes present above the reporting limit?	☒	☐	☐	
	ii.	If yes, are the same compounds also present in the samples? Explain possible impact.	☒	☐	☐	Results <10x blank concentration and have the potential to be false positives or have a high bias. Results were B flagged.
b.	Do method blanks for any analyses contain target analytes above the reporting limit?		☐	☒	☐	
	i.	If yes, are the same compounds present in the samples?	☐	☐	☒	
	ii.	Is the amount of target analyte in the blank more than 1/10th of that in the sample(s)? Explain the possible impact on sample results.	☐	☐	☒	

4. Surrogates

Question			Yes	No	N/A	Comments
a.	Are there organic analyses that contain surrogate compounds?		☒	☐	☐	
b.	Are the lab recovery limits specified on the report?		☒	☐	☐	Surrogate for PCP analysis, 46 - 125%R, okay
	i.	Do the lab limits seem reasonable when compared with the suggested guidelines in the MPCA QC Policy?	☒	☐	☐	
c.	Are there surrogates outside lab limits? (These should have a data qualifier)		☐	☒	☐	
	i.	If yes, are the surrogates above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Explain what this could mean for the affected samples.	☐	☐	☒	

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Question			Yes	No	N/A	Comments
a.	Are there LCS/LCSD samples present for the reported analyses? (An LCS alone is acceptable if there is an Matrix Spike/Matrix Spike Duplicate [MS/MSD] or sample/sample dup for precision.)		☒	☐	☐	LCS
	i.	If so, do the lab limits seem reasonable compared to the suggested guidelines in the MPCA QC Policy?	☐	☒	☐	PCP 30-125% vs MPCA limits of 50-150%
b.	Are there LCS/LCSD compounds outside lab limits? (These should have a data qualifier.)		☐	☒	☐	
	i.	If yes, are the analytes above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Are all samples in the preparation batch also flagged for the same analyte(s)?	☐	☐	☒	
	iv.	Explain what this could mean for the affected samples.	☐	☐	☒	

6. Matrix Spike/Matrix Spike Duplicate/Sample Duplicate (MS/MSD/Dup)

Question				Yes	No	N/A	Comments
a.	Do the analytical methods used require an MS and/or MSD? If no, skip to 6.b.			☒	☐	☐	
	i.	Have the required matrix spikes been prepared and reported?		☒	☐	☐	
	ii.	If no, is there and explanation in the report as to why?		☐	☐	☒	
	iii.	Did the lab process an alternate spiked sample (such as LCSD) instead?		☐	☐	☒	
	iv.	Are the lab limits specified on the report?		☒	☐	☐	
	v.	Do the limits seem reasonable when compared to the suggested guidelines in the MPCA QC Policy?		☐	☒	☐	PCP: 30-125 vs 50 - 150%
	vi.	Are there compounds outside the lab limits?		☐	☒	☐	
		1.	If yes, are the analytes above the lab limits?	☐	☐	☒	
		2.	Below the lab limits?	☐	☐	☒	
		3.	Is the source sample also flagged for compounds outside lab limits?	☐	☐	☒	
b.	Is a sample duplicate reported for the analytical method(s)? If no, skip to 6.c.			☒	☐	☐	Four field duplicates were collected over the sampling event, RPDs <20% for all results
	i.	Is the RPD for the duplicate pair within the lab limits?		☒	☐	☐	
	ii.	If no, has the associated source sample been flagged?		☐	☐	☒	
c.	What is the impact of failed QC on this project?			☐	☐	☒	

7. Method Detection Limits/Report Limits

Question		Yes	No	N/A	Comments
a.	Are reporting and/or method detection limits clearly listed on the report for all analyses? (may also be called quantitation limits)	☒	☐	☐	Results reported to the MDL

Additional comments on report:

Hexavalent chromium results were flagged due to associated equipment blank contamination of 0.15 ug/L as follows:

EW-18: 1.3 J

EW-15: Detect 0.08 ug/L changed to <0.08 ug/L and the MDL and RL were changed to 0.08

EW-16: 0.25 J

EW-12: 0.36 J

Results <PQL were J qualified by the laboratory. No other data qualifiers were assigned.

Pace is not NELAC accredited for the hexavalent chromium analysis. They are certified through MDH.

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Laboratory Data Review Checklist

Doc Type: Data Review

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Project Information

Project name: MacGillis and Gibbs Quarterly Sampling Laboratory: Pace

Work order number: 10368798 Report date (mm/dd/yyyy): 11/15/2016

1. Preservation

For help with this section on holding times, containers and preservatives, refer to the Minnesota Department of Health's website at: http://www.health.state.mn.us/divs/phl/environmental/handbook/internet/envhandbook.html.

Questions			Yes	No	N/A	Comments
a.	Is there a chain of custody (COC) with the report?		☒	☐	☐	Dioxin results submitted in separate SDG
b.	Is there a sample condition form with the report?		☒	☐	☐	
c.	Were there samples requiring preservation?		☐	☒	☐	
	i.	If so, were they properly preserved?	☐	☐	☒	
	ii.	Were they received on ice?	☐	☐	☒	
d.	Were samples received in the correct containers?		☒	☐	☐	
	i.	Was there enough sample volume/weight to complete all requested analyses?	☒	☐	☐	
	ii.	Was there enough extra sample collected to complete method required batch QC?	☐	☒	☐	Sufficient MS/MSDs for the event were performed.
e.	Were samples received with adequate holding time for sample prep for all requested analyses?		☒	☐	☐	
f.	Are there notes about sample condition or holding time issues on the COC? Explain impact.		☐	☒	☐	
g.	Is there narration or data qualifiers within the report about sample condition or holding time issues? Explain impact.		☐	☒	☐	

2. Calibration

Question		Yes	No	N/A	Comments
a.	Do the report narrative or data qualifiers indicate calibration problems for any analyses? If yes, explain the data impact.	☐	☒	☐	

3. Blanks

Question			Yes	No	N/A	Comments
a.	Do any of the analyses contain samples for field or trip blanks?		☒	☐	☐	
	i.	If yes, are there target analytes present above the reporting limit?	☐	☐	☒	
	ii.	If yes, are the same compounds also present in the samples? Explain possible impact.	☐	☐	☒	
b.	Do method blanks for any analyses contain target analytes above the reporting limit?		☐	☒	☐	
	i.	If yes, are the same compounds present in the samples?	☐	☐	☒	
	ii.	Is the amount of target analyte in the blank more than 1/10th of that in the sample(s)? Explain the possible impact on sample results.	☐	☐	☒	

4. Surrogates

Question			Yes	No	N/A	Comments
a.	Are there organic analyses that contain surrogate compounds?		☒	☐	☐	
b.	Are the lab recovery limits specified on the report?		☒	☐	☐	Surrogate for PCP analysis, 46 - 125%R, okay
	i.	Do the lab limits seem reasonable when compared with the suggested guidelines in the MPCA QC Policy?	☒	☐	☐	
c.	Are there surrogates outside lab limits? (These should have a data qualifier)		☒	☐	☐	Diluted out, okay.
	i.	If yes, are the surrogates above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Explain what this could mean for the affected samples.	☐	☐	☒	

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Question			Yes	No	N/A	Comments
a.	Are there LCS/LCSD samples present for the reported analyses? (An LCS alone is acceptable if there is an Matrix Spike/Matrix Spike Duplicate [MS/MSD] or sample/sample dup for precision.)		☒	☐	☐	LCS/LCSD
	i.	If so, do the lab limits seem reasonable compared to the suggested guidelines in the MPCA QC Policy?	☐	☒	☐	PCP 30-125% vs MPCA limits of 50-150%
b.	Are there LCS/LCSD compounds outside lab limits? (These should have a data qualifier.)		☐	☒	☐	
	i.	If yes, are the analytes above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Are all samples in the preparation batch also flagged for the same analyte(s)?	☐	☐	☒	
	iv.	Explain what this could mean for the affected samples.	☐	☐	☒	

6. Matrix Spike/Matrix Spike Duplicate/Sample Duplicate (MS/MSD/Dup)

Question				Yes	No	N/A	Comments
a.	Do the analytical methods used require an MS and/or MSD? If no, skip to 6.b.			☒	☐	☐	
	i.	Have the required matrix spikes been prepared and reported?		☐	☒	☐	Sufficient provided in alternate SDGs for the event
	ii.	If no, is there and explanation in the report as to why?		☐	☐	☒	
	iii.	Did the lab process an alternate spiked sample (such as LCSD) instead?		☐	☐	☒	
	iv.	Are the lab limits specified on the report?		☐	☐	☒	
	v.	Do the limits seem reasonable when compared to the suggested guidelines in the MPCA QC Policy?		☐	☐	☒	
	vi.	Are there compounds outside the lab limits?		☐	☐	☒	
		1.	If yes, are the analytes above the lab limits?	☐	☐	☒	
		2.	Below the lab limits?	☐	☐	☒	
		3.	Is the source sample also flagged for compounds outside lab limits?	☐	☐	☒	
b.	Is a sample duplicate reported for the analytical method(s)? If no, skip to 6.c.			☒	☐	☐	Four field duplicates were collected over the sampling event, RPDs <20% for all results
	i.	Is the RPD for the duplicate pair within the lab limits?		☒	☐	☐	LCS/LCSD RPD okay
	ii.	If no, has the associated source sample been flagged?		☐	☐	☒	
c.	What is the impact of failed QC on this project?			☐	☐	☒	

7. Method Detection Limits/Report Limits

Question		Yes	No	N/A	Comments
a.	Are reporting and/or method detection limits clearly listed on the report for all analyses? (may also be called quantitation limits)	☒	☐	☐	Results reported to the MDL

Additional comments on report:

Results <PQL were J qualified by the laboratory. No other data qualifiers were assigned.

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Laboratory Data Review Checklist

Doc Type: Data Review

Instructions: The following is the Minnesota Pollution Control Agency's (MPCA) informal checklist that may be used to review data. The information follows the general format of the National Functional Guidelines which is the primary data review tool used in the U.S. Environmental Protection Agency's Contract Laboratory Program for Superfund analytical work. This checklist should be used in conjunction with the *Laboratory Data Checklist Guidance* (p-eao-11a): http://www.pca.state.mn.us/index.php/view-document.html?gid=16113. Also see the MPCA Laboratory Quality Control (QC) and Data Policy: http://www.pca.state.mn.us/index.php/view-document.html?gid=16288.

Project Information

Project name: MacGillis and Gibbs Quarterly Sampling Laboratory: Pace

Work order number: 10368468 Report date (mm/dd/yyyy): 11/2/2016

1. Preservation

For help with this section on holding times, containers and preservatives, refer to the Minnesota Department of Health's website at: http://www.health.state.mn.us/divs/phl/environmental/handbook/internet/envhandbook.html.

Questions			Yes	No	N/A	Comments
a.	Is there a chain of custody (COC) with the report?		☒	☐	☐	
b.	Is there a sample condition form with the report?		☒	☐	☐	
c.	Were there samples requiring preservation?		☐	☒	☐	
	i.	If so, were they properly preserved?	☐	☐	☒	
	ii.	Were they received on ice?	☒	☐	☐	Cooler >6 degrees C. Samples collected same day and hand delivered, cooling started. Okay.
d.	Were samples received in the correct containers?		☒	☐	☐	
	i.	Was there enough sample volume/weight to complete all requested analyses?	☒	☐	☐	
	ii.	Was there enough extra sample collected to complete method required batch QC?	☐	☐	☒	
e.	Were samples received with adequate holding time for sample prep for all requested analyses?		☒	☐	☐	
f.	Are there notes about sample condition or holding time issues on the COC? Explain impact.		☐	☒	☐	
g.	Is there narration or data qualifiers within the report about sample condition or holding time issues? Explain impact.		☐	☒	☐	

2. Calibration

Question		Yes	No	N/A	Comments
a.	Do the report narrative or data qualifiers indicate calibration problems for any analyses? If yes, explain the data impact.	☐	☒	☐	

3. Blanks

Question			Yes	No	N/A	Comments
a.	Do any of the analyses contain samples for field or trip blanks?		☐	☒	☐	
	i.	If yes, are there target analytes present above the reporting limit?	☐	☐	☒	
	ii.	If yes, are the same compounds also present in the samples? Explain possible impact.	☐	☐	☒	
b.	Do method blanks for any analyses contain target analytes above the reporting limit?		☒	☐	☐	
	i.	If yes, are the same compounds present in the samples?	☒	☐	☐	
	ii.	Is the amount of target analyte in the blank more than 1/10th of that in the sample(s)? Explain the possible impact on sample results.	☒	☐	☐	Potential high bias. B flagged. See comments

4. Surrogates

Question			Yes	No	N/A	Comments
a.	Are there organic analyses that contain surrogate compounds?		☒	☐	☐	Dioxins - internal standards used
b.	Are the lab recovery limits specified on the report?		☐	☒	☐	
	i.	Do the lab limits seem reasonable when compared with the suggested guidelines in the MPCA QC Policy?	☐	☐	☒	
c.	Are there surrogates outside lab limits? (These should have a data qualifier)		☐	☐	☒	Recoveries ranged from 54-99%, reasonable.
	i.	If yes, are the surrogates above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Explain what this could mean for the affected samples.	☐	☐	☒	

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Question			Yes	No	N/A	Comments
a.	Are there LCS/LCSD samples present for the reported analyses? (An LCS alone is acceptable if there is an Matrix Spike/Matrix Spike Duplicate [MS/MSD] or sample/sample dup for precision.)		☒	☐	☐	LCS/LCSD
	i.	If so, do the lab limits seem reasonable compared to the suggested guidelines in the MPCA QC Policy?	☒	☐	☐	
b.	Are there LCS/LCSD compounds outside lab limits? (These should have a data qualifier.)		☐	☒	☐	
	i.	If yes, are the analytes above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Are all samples in the preparation batch also flagged for the same analyte(s)?	☐	☐	☒	

	iv.	Explain what this could mean for the affected samples.	☐	☐	☒	

6. Matrix Spike/Matrix Spike Duplicate/Sample Duplicate (MS/MSD/Dup)

Question			Yes	No	N/A	Comments
a.	Do the analytical methods used require an MS and/or MSD? If no, skip to 6.b.		☐	☒	☐	
	i.	Have the required matrix spikes been prepared and reported?	☐	☐	☒	
	ii.	If no, is there and explanation in the report as to why?	☐	☐	☒	
	iii.	Did the lab process an alternate spiked sample (such as LCSD) instead?	☐	☐	☒	
	iv.	Are the lab limits specified on the report?	☐	☐	☒	
	v.	Do the limits seem reasonable when compared to the suggested guidelines in the MPCA QC Policy?	☐	☐	☒	
	vi.	Are there compounds outside the lab limits?	☐	☐	☒	
		1. If yes, are the analytes above the lab limits?	☐	☐	☒	
		2. Below the lab limits?	☐	☐	☒	
		3. Is the source sample also flagged for compounds outside lab limits?	☐	☐	☐	
b.	Is a sample duplicate reported for the analytical method(s)? If no, skip to 6.c.		☒	☐	☐	LCS/LCSD
	i.	Is the RPD for the duplicate pair within the lab limits?	☒	☐	☐	
	ii.	If no, has the associated source sample been flagged?	☐	☐	☒	
c.	What is the impact of failed QC on this project?		☐	☐	☒	

7. Method Detection Limits/Report Limits

Question		Yes	No	N/A	Comments
a.	Are reporting and/or method detection limits clearly listed on the report for all analyses? (may also be called quantitation limits)	☒	☐	☐	Results below the calibration range were flagged J and are considered estimated

Additional comments on report:

Laboratory J flags were retained. The laboratory flag "I" to indicate incorrect isotope ratios were obtained were changed to a J flag.

The OCDD results for sample MW-19B was qualified B due to associated method blank contamination.

Minnesota Pollution Control Agency
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Laboratory Data Review Checklist

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Project Information

Project name: MacGillis and Gibbs Quarterly Sampling Laboratory: Pace

Work order number: 10368585 Report date (mm/dd/yyyy): 11/3/2016

1. Preservation

For help with this section on holding times, containers and preservatives, refer to the Minnesota Department of Health's website at: http://www.health.state.mn.us/divs/phl/environmental/handbook/internet/envhandbook.html.

Questions			Yes	No	N/A	Comments
a.	Is there a chain of custody (COC) with the report?		☒	☐	☐	
b.	Is there a sample condition form with the report?		☒	☐	☐	
c.	Were there samples requiring preservation?		☐	☒	☐	
	i.	If so, were they properly preserved?	☐	☐	☒	
	ii.	Were they received on ice?	☒	☐	☐	Cooler >6 degrees C. Samples collected same day and hand delivered, cooling started. Okay.
d.	Were samples received in the correct containers?		☒	☐	☐	
	i.	Was there enough sample volume/weight to complete all requested analyses?	☒	☐	☐	
	ii.	Was there enough extra sample collected to complete method required batch QC?	☐	☐	☒	
e.	Were samples received with adequate holding time for sample prep for all requested analyses?		☒	☐	☐	
f.	Are there notes about sample condition or holding time issues on the COC? Explain impact.		☐	☒	☐	
g.	Is there narration or data qualifiers within the report about sample condition or holding time issues? Explain impact.		☐	☒	☐	

2. Calibration

Question		Yes	No	N/A	Comments
a.	Do the report narrative or data qualifiers indicate calibration problems for any analyses? If yes, explain the data impact.	☐	☒	☐	

3. Blanks

Question			Yes	No	N/A	Comments
a.	Do any of the analyses contain samples for field or trip blanks?		☐	☒	☐	
	i.	If yes, are there target analytes present above the reporting limit?	☐	☐	☒	
	ii.	If yes, are the same compounds also present in the samples? Explain possible impact.	☐	☐	☒	
b.	Do method blanks for any analyses contain target analytes above the reporting limit?		☒	☐	☐	
	i.	If yes, are the same compounds present in the samples?	☒	☐	☐	
	ii.	Is the amount of target analyte in the blank more than 1/10th of that in the sample(s)? Explain the possible impact on sample results.	☒	☐	☐	Potential high bias. Results flagged. See comments

4. Surrogates

Question			Yes	No	N/A	Comments
a.	Are there organic analyses that contain surrogate compounds?		☒	☐	☐	Dioxins - internal standards used
b.	Are the lab recovery limits specified on the report?		☐	☒	☐	
	i.	Do the lab limits seem reasonable when compared with the suggested guidelines in the MPCA QC Policy?	☐	☐	☒	
c.	Are there surrogates outside lab limits? (These should have a data qualifier)		☐	☐	☒	Recoveries ranged from 46-97%, reasonable.
	i.	If yes, are the surrogates above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Explain what this could mean for the affected samples.	☐	☐	☒	

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Question			Yes	No	N/A	Comments
a.	Are there LCS/LCSD samples present for the reported analyses? (An LCS alone is acceptable if there is an Matrix Spike/Matrix Spike Duplicate [MS/MSD] or sample/sample dup for precision.)		☒	☐	☐	LCS/LCSD
	i.	If so, do the lab limits seem reasonable compared to the suggested guidelines in the MPCA QC Policy?	☒	☐	☐	
b.	Are there LCS/LCSD compounds outside lab limits? (These should have a data qualifier.)		☐	☒	☐	
	i.	If yes, are the analytes above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Are all samples in the preparation batch also flagged for the same analyte(s)?	☐	☐	☒	

	iv.	Explain what this could mean for the affected samples.	☐	☐	☒	

6. Matrix Spike/Matrix Spike Duplicate/Sample Duplicate (MS/MSD/Dup)

Question				Yes	No	N/A	Comments
a.	Do the analytical methods used require an MS and/or MSD? If no, skip to 6.b.			☐	☒	☐	
	i.	Have the required matrix spikes been prepared and reported?		☐	☐	☒	
	ii.	If no, is there and explanation in the report as to why?		☐	☐	☒	
	iii.	Did the lab process an alternate spiked sample (such as LCSD) instead?		☐	☐	☒	
	iv.	Are the lab limits specified on the report?		☐	☐	☒	
	v.	Do the limits seem reasonable when compared to the suggested guidelines in the MPCA QC Policy?		☐	☐	☒	
	vi.	Are there compounds outside the lab limits?		☐	☐	☒	
		1.	If yes, are the analytes above the lab limits?	☐	☐	☒	
		2.	Below the lab limits?	☐	☐	☒	
		3.	Is the source sample also flagged for compounds outside lab limits?	☐	☐	☐	
b.	Is a sample duplicate reported for the analytical method(s)? If no, skip to 6.c.			☒	☐	☐	LCS/LCSD; one field duplicate. Results compared well.
	i.	Is the RPD for the duplicate pair within the lab limits?		☒	☐	☐	
	ii.	If no, has the associated source sample been flagged?		☐	☐	☒	
c.	What is the impact of failed QC on this project?			☐	☐	☒	

7. Method Detection Limits/Report Limits

Question		Yes	No	N/A	Comments
a.	Are reporting and/or method detection limits clearly listed on the report for all analyses? (may also be called quantitation limits)	☒	☐	☐	Results below the calibration range were flagged J by the laboratory and are considered estimated

Additional comments on report:

The laboratory flagged results associated with method blank contamination B1. This flag was retained for reporting.

The Total 2,3,7,8-TCDD results for samples MW-11B, EW-11, MW-20 and Dup-2 (MW-20 FD) were qualified as estimated (J) because the detections that went into the calculation were associated with blank contamination at similar concentrations.

Laboratory J flags were retained. The laboratory flag "I" to indicate incorrect isotope ratios were obtained were changed to a J flag.

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Laboratory Data Review Checklist

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Project Information

Project name: MacGillis and Gibbs Quarterly Sampling Laboratory: Pace

Work order number: 10368800 Report date (mm/dd/yyyy): 11/4/2016

1. Preservation

For help with this section on holding times, containers and preservatives, refer to the Minnesota Department of Health's website at: http://www.health.state.mn.us/divs/phl/environmental/handbook/internet/envhandbook.html.

Questions			Yes	No	N/A	Comments
a.	Is there a chain of custody (COC) with the report?		☒	☐	☐	
b.	Is there a sample condition form with the report?		☒	☐	☐	
c.	Were there samples requiring preservation?		☐	☒	☐	
	i.	If so, were they properly preserved?	☐	☐	☒	
	ii.	Were they received on ice?	☒	☐	☐	Cooler >6 degrees C. Samples collected same day and hand delivered, cooling started. Okay.
d.	Were samples received in the correct containers?		☒	☐	☐	
	i.	Was there enough sample volume/weight to complete all requested analyses?	☒	☐	☐	
	ii.	Was there enough extra sample collected to complete method required batch QC?	☐	☐	☒	
e.	Were samples received with adequate holding time for sample prep for all requested analyses?		☒	☐	☐	
f.	Are there notes about sample condition or holding time issues on the COC? Explain impact.		☐	☒	☐	
g.	Is there narration or data qualifiers within the report about sample condition or holding time issues? Explain impact.		☐	☒	☐	

2. Calibration

Question		Yes	No	N/A	Comments
a.	Do the report narrative or data qualifiers indicate calibration problems for any analyses? If yes, explain the data impact.	☐	☒	☐	

3. Blanks

Question			Yes	No	N/A	Comments
a.	Do any of the analyses contain samples for field or trip blanks?		☐	☒	☐	
	i.	If yes, are there target analytes present above the reporting limit?	☐	☐	☒	
	ii.	If yes, are the same compounds also present in the samples? Explain possible impact.	☐	☐	☒	
b.	Do method blanks for any analyses contain target analytes above the reporting limit?		☒	☐	☐	
	i.	If yes, are the same compounds present in the samples?	☒	☐	☐	
	ii.	Is the amount of target analyte in the blank more than 1/10th of that in the sample(s)? Explain the possible impact on sample results.	☐	☒	☐	Samples either ND or >10x blank, no qualifiers.

4. Surrogates

Question			Yes	No	N/A	Comments
a.	Are there organic analyses that contain surrogate compounds?		☒	☐	☐	Dioxins - internal standards used
b.	Are the lab recovery limits specified on the report?		☐	☒	☐	
	i.	Do the lab limits seem reasonable when compared with the suggested guidelines in the MPCA QC Policy?	☐	☐	☒	
c.	Are there surrogates outside lab limits? (These should have a data qualifier)		☐	☐	☒	Recoveries ranged from 80-110%, reasonable.
	i.	If yes, are the surrogates above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Explain what this could mean for the affected samples.	☐	☐	☒	

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Question			Yes	No	N/A	Comments
a.	Are there LCS/LCSD samples present for the reported analyses? (An LCS alone is acceptable if there is an Matrix Spike/Matrix Spike Duplicate [MS/MSD] or sample/sample dup for precision.)		☒	☐	☐	LCS/LCSD
	i.	If so, do the lab limits seem reasonable compared to the suggested guidelines in the MPCA QC Policy?	☒	☐	☐	
b.	Are there LCS/LCSD compounds outside lab limits? (These should have a data qualifier.)		☐	☒	☐	
	i.	If yes, are the analytes above the lab limits?	☐	☐	☒	
	ii.	Below the lab limits?	☐	☐	☒	
	iii.	Are all samples in the preparation batch also flagged for the same analyte(s)?	☐	☐	☒	

	iv.	Explain what this could mean for the affected samples.	☐	☐	☒	

6. Matrix Spike/Matrix Spike Duplicate/Sample Duplicate (MS/MSD/Dup)

Question			Yes	No	N/A	Comments
a.	Do the analytical methods used require an MS and/or MSD? If no, skip to 6.b.		☐	☒	☐	
	i.	Have the required matrix spikes been prepared and reported?	☐	☐	☒	
	ii.	If no, is there and explanation in the report as to why?	☐	☐	☒	
	iii.	Did the lab process an alternate spiked sample (such as LCSD) instead?	☐	☐	☒	
	iv.	Are the lab limits specified on the report?	☐	☐	☒	
	v.	Do the limits seem reasonable when compared to the suggested guidelines in the MPCA QC Policy?	☐	☐	☒	
	vi.	Are there compounds outside the lab limits?	☐	☐	☒	
		1. If yes, are the analytes above the lab limits?	☐	☐	☒	
		2. Below the lab limits?	☐	☐	☒	
		3. Is the source sample also flagged for compounds outside lab limits?	☐	☐	☐	
b.	Is a sample duplicate reported for the analytical method(s)? If no, skip to 6.c.		☒	☐	☐	LCS/LCSD
	i.	Is the RPD for the duplicate pair within the lab limits?	☒	☐	☐	
	ii.	If no, has the associated source sample been flagged?	☐	☐	☒	
c.	What is the impact of failed QC on this project?		☐	☐	☒	

7. Method Detection Limits/Report Limits

Question		Yes	No	N/A	Comments
a.	Are reporting and/or method detection limits clearly listed on the report for all analyses? (may also be called quantitation limits)	☒	☐	☐	Results below the calibration range were flagged J and are considered estimated

Additional comments on report:

No qualifiers were added due to this review. Laboratory J flags were retained. The laboratory flag "I" to indicate incorrect isotope ratios were obtained were changed to a J flag.

Cibulskis, Karen

From: Wallerstedt, Jamie (MPCA) <jamie.wallerstedt@state.mn.us>
Sent: Wednesday, May 03, 2017 9:46 AM
To: Cibulskis, Karen
Subject: MacGillis and Gibbs - Quarterly GW report summaries
Attachments: Final Quarterly Sampling Report FY 2017 First Quarter.pdf; Final Quarterly Sampling Report FY 2017 Second Quarter.pdf

HI Karen,
Attached are the quarterly groundwater monitoring reports from AECOM. They owe us one more and I will forward that along to you once I receive it. These are not something that needs a review, but a submittal to provide us the data. The data analysis reports (i.e. the capture analysis and contingency plan) will be following early next week to you for review.

Thanks!

Jamie Wallerstedt, PE
Project Manager/Engineer
MPCA/Remediation Division
520 Lafayette Road North
St. Paul, MN 55155

Direct: 651.757.2094
Email: jamie.wallerstedt@state.mn.us